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Hunger Relief Software: An Information Management Solution for Food Pantries

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Hunger Relief Software:

An Information Management Solution for Food Pantries

Interactive Qualifying Project Report completed in partial fulfillment
of the Bachelor of Science degree at
Worcester Polytechnic Institute, Worcester, MA

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This document represents the work of WPI students. The opinions expressed in this report are not necessarily those of the Worcester Polytechnic Institute.

Abstract

Hunger relief is an integral aspect of modern civilized societies. As the number of food insecure people grows, it becomes increasingly important to address the challenges faced by hunger relief organizations. Food pantries encounter many challenges because they have few available resources and are primarily run by volunteers. These challenges cause inefficiencies that bottleneck hunger relief efforts at the bottom of the hierarchy. The most appropriate response to these inefficiencies is an information management solution that automates the time-consuming and repetitive tasks performed by food pantry volunteers. This project seeks to understand the requirements for this solution and provide an acceptable implementation that meets those requirements to the Burlington Community Food Pantry.

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1. Introduction

1.1 History

In the early days of our species, humans were nomadic creatures that traveled across the landscape fishing and hunting for food. During this period of time, the technological advancements were sparse and consisted mainly of primitive tools, weapons and use of animal hides. Eventually tribes settled and focused their efforts on agriculture and domesticated animals as a means of food, but were still restricted to fertile land with ample rainfall. Despite the stability, technological progress did not accelerate; it took thousands of years for inventions such as the wheel, horse harness, rudder and the chimney to come into use. Time that could have been used to invent new technologies instead spent securing food. The need for food dramatically held back the progress of humanity. [1]

It is said that savagery is the "condition in which man lived when much effort brought small results." This state of mankind was prolonged by population growth that consumed land and food, impeding any chance of abundance. When war or exploration increased the available good land and resources however, it became possible to grow a surplus of food. Food security allowed for leisure and study which set the stage for technological advance. New technologies raised the standard of living, in turn making those people more prosperous. Essentially, when a subset of the population can provide food to the rest then everyone will benefit. [1]

In the years since, society has grown significantly. One of the most prominent events in human history is the migration of Europeans to the North American continent. Although the New World offered a plethora of resources, advances and productive labor, the real changes did not occur until the 19th century. By this time, food was more abundant and less expensive such that a great many people did not need to focus on securing it. The increased research and labor resulted in the development of railroads, steamships and factories; advances "from which all present-day comforts have sprung." The growing sophistication of human societies and culture has altered how we survive and evolve. Our ability to provide one another with basic needs is integral to life as we know it today. [1]

In 1945, the United Nations established the Food and Agriculture Organization (FAO) in Rome. The two purposes were to create a neutral forum allowing different countries to discuss policy and to be a source of knowledge and information. The FAO facilitates the helping of developing countries to

modernize agriculture, forestry and fishing while establishing good nutrition. The organization also responds to other global issues including H1N1 and the recent Haiti catastrophe. [2]

As of January, 2010 there are 210 countries that participate in FAO. The large scope of involvement provides for easily accessible statistics. The measurement of food security can help to gauge success of certain programs as well as observe overall trends of the world, different countries and their localized regions. Between the early and late 1990s, the number of undernourished persons worldwide dropped by just over twenty million; by the next millennium however, the number has risen to more than it was in the early 1990s and as the decade progresses the number is still growing. These numbers have to be put within the context of populations though. Looking at the same time periods, the prevalence of undernourishment based on the total population of the world was approximately 16% in the early 1990s where it has dropped to 14% by 2000 and eventually 13% some years later. [2]

Each statistical measurement reveals different aspects of the hunger problem. The percentages seem to show that the problem is under control and that the programs are successful. However, the sheer numbers still show that there are more underfed people today than there were yesterday. The organization itself has reported there is enough food produced worldwide to feed every single living human; in fact, it has the capacity to feed double that. We have the food to feed twelve billion people and yet we cannot feed the six billion we have. Even in a world of plenty, people still go hungry. [3]

The federal organization in the United States for measuring food security is known as the Economic Research Service and is a department of the United States Department of Agriculture. The roots of this organization date back to the early twentieth century. The research focuses on a competitive agricultural system, a safe food supply, a healthy well-nourished population, harmony between agriculture and environment as well as an enhanced quality of life for rural Americans. [7]

The Economic Research Service defines food security as all members of a family having access all the time to enough food for an active healthy life. This means that the food should be both nutritionally adequate and safe. It also means that the food is acquired in "socially acceptable" ways; that is, not resorting to emergency food supplies, scavenging or stealing. According to their data, about 14.6% of United States households were food insecure at some point during 2008. This is up from 11.1% in 2007 and is the highest rate in over a decade. Hunger is a growing problem in the United States. The US has the fourth highest GDP per capita in the world and yet an unacceptably large portion of its citizens are malnourished and underfed. [8]

Feeding America is the largest domestic hunger relief charity in the United States and is a network of more than 200 food banks. Feeding America conducted a national study called Hunger in America 2010 which is a report on the emergency food distribution in the United States during 2009. Massachusetts has three food banks that belong to the Feeding America national food bank network: The Greater Boston Food Bank, Worcester County Food Bank, and The Food Bank of Western Massachusetts which provide food and other services to 879 local agencies. These food banks serve to help solve the hunger problems through distribution of food and grocery products as well as through public education. The 2010 Hunger Study concluded that Massachusetts food banks provide emergency hunger relief to about 571,600 low-income people annually. That accounts for roughly 9% of the Massachusetts population. This is a 23% increase in people receiving hunger relief since the 2006 Massachusetts Hunger Study. When faced with hunger, people have to make difficult choices between food and other basic needs. More than 61% of Massachusetts food bank clients have had to choose between food and paying for utilities or fuel, rent or mortgage, medical bills, or transportation. [4]

Hunger in Eastern Massachusetts is a growing problem. The Greater Boston Food Bank provides annual food assistance to an estimated 321,500 low-income people as found in a hunger study in 2006. This is a 14% increase since the 2001 study, showing an increasing trend of hunger in the United States. This means that the Greater Boston Food Bank now provides food assistance for nearly 7% of the population of Eastern Massachusetts. According to the Hunger Study in 2006, 52% of the people receiving food assistance live in rural or suburban areas. [4]

The Greater Boston Food Bank, Worcester County Food Bank, and The Food Bank of Western Massachusetts provide food and other services to 879 local agencies which operate over 1,300 hunger relief programs. These food banks are the primary providers of food and other services to three main types of local hunger relief agencies: shelters, kitchens, and food pantries. Shelters such as homeless shelters, spousal shelters, and transitional shelters provide people who are in need with a safe place to stay and eat. Kitchens serve individuals meals at various times during the week and make up 11% of the programs run by food banks in Massachusetts. Food pantries account for 35% of the programs operated by the agencies receiving aid in Massachusetts. A food pantry will provide enough food to last a household several weeks to a month. [5]

1.2 Project Description

Food pantries are run primarily as volunteer organizations which unfortunately can lend itself to inefficiency. This general inefficiency is one of the limiting factors for distribution of food. If the volunteers at a pantry were able to accomplish the same tasks more quickly, they would then be able to accomplish more tasks in a given time frame. The increased capacity of work per volunteer would then mean that without increasing the number of volunteers a pantry could support more families in need. To decrease the amount of time required to complete the work, there must be automation of the simple tasks in place.

The focus of our effort is to increase the efficiency of the Burlington Community Food Pantry. Food pantries keep track of information about individuals and families to ensure they are eligible for federal and state aids. They must also manage an inventory of groceries and keep records of received donations, purchased goods, and federal and state support such as The Emergency Food Assistance Program (TEFAP) and The Massachusetts Emergency Food Assistance Program (MEFAP). This information is used to generate monthly reports of statistical information about individuals receiving. This information is collected for research and is used in a continuous hunger study in the United States. Food pantries must also predict how many families will come each month and assemble the appropriate number of bags. A software system that can help manage all this information and help automate these tasks is especially beneficial. This project focuses on understanding and eliminating these inefficiencies by providing a software solution.

2. Background

To address the problems of the Burlington Community Food Pantry (BCFP), it is important to understand the domain of hunger relief organizations within the context of technology. The background chapter presents information about the organizations with which the BCFP interacts as well as the software systems used by those organizations. By understanding the scope of these organizations and processes, it is possible to address the needs of the BCFP.

2.1 Organizations

There are three primary organizations with which the BCFP deals. The first is The Emergency Food Assistance Program, a federal organization. The second is the Massachusetts Emergency Food Assistance Program, a state organization. The final organization is Feeding America, an independent national program. Each of the organizations provides aid to the BCFP in some way.

2.1.1 The Emergency Food Assistance Program

2.1.1.1 History

The Emergency Food Assistance Program (TEFAP) is run by the federal government to help supplement the diets of low-income Americans and provide food and nutrition assistance at no cost. The program was originated by the United States Department of Agriculture (USDA) in 1981 with help from the Commodity Credit Corporation to reduce federal food inventory and storage costs by immediately shipping food to organizations lower on the hierarchy.

In 1983, Congress passed the Temporary Emergency Food Assistance Act which allocated funds to assist states with the costs for storing and distributing commodities. A few years later, the Hunger Prevention Act was passed in 1988 to authorize the appropriation of funds for the purchase of commodities specifically for TEFAP. The program was finally named The Emergency Food Assistance Program in the 1990 Farm Bill.

Almost two decades later, the American Recovery and Reinvestment Act was signed by President Barack Obama in 2009. This latest legislation gave an additional \$100 million for TEFAP food and \$25 million for TEFAP administrative support. The stimulus in this case is intended to increase

government spending to offset the lack of consumer spending during the recession. Fortunately, funds are going to areas that will be able to help people in need. [10]

2.1.1.2 Funding

The funding for TEFAP is supplied by from the federal government of the United States, which of course means it largely comes from taxes paid by the citizens of the United States. In 2009, the cost of the TEFAP program was \$299.5 million. Of this, \$250 million was spent on the actual food and \$49.5 million was spent on administrative support. This is an increase from the 2008 cost of \$178.1 million, which is probably a direct result of the American Recovery and Reinvestment Act. The money is spent primarily on food, storage and distribution costs. [13]

2.1.1.3 Food Sources

The Commodity Credit Corporation (CCC) is a government corporation established in 1933 to stabilize, support and protect farm income and prices. Through this financial institution, the USDA purchases commodities for the TEFAP organization. The CCC itself has no employees and is administered by other divisions of the USDA. The relationship between the two organizations began when the TEFAP program originally evolved out of a surplus in cheese held by the CCC. [13]

2.1.1.4 Clients

The client households that can receive TEFAP assistance are determined by state set criteria which are usually based on income standards. The reason for this is that the state can then adjust the criteria to ensure the assistance is provided to those most in need. Recipients of prepared meals—such as those in soup kitchens—are considered to be needy and are not subject to a means test. States then provide the food to other types of local organizations which actually distribute the food for household consumption or prepare and serve it in a congregate setting. The non-profit organizations that provide food assistance for home use must establish the eligibility of each household. For prepared meals, they must demonstrate that they serve predominantly needy persons. The homeless are eligible, but must still meet income requirements to receive non-prepared meals. [13]

2.1.1.5 Services

The TEFAP program provides a number of services. First, the USDA purchases food which includes canned fruits, canned veggies, fruit juice, dried egg mix, meat, poultry, fish, dried beans, pasta products, peanut butter, rice, grits, cereal and soups. Then these commodities are processed, packaged and shipped to states. The amount received per state depends on the number of low-income and unemployed constituents reported. The rest of the process is delegated to the local agencies.

TEFAP households—including senior citizens—may be eligible to receive food stamps. Food stamps are provided by the Supplemental Nutrition Assistance Program (SNAP), a program run by the Food and Nutrition Service of the USDA. Low-income families can apply for benefits and will receive an electronic card. The electronic card is similar to an ATM card and is accepted at most grocery stores. [26]

TEFAP also funds the National School Lunch Program (NSLP). The NSLP provides special supplemental nutrition for women, infants and children. There is also a food distribution program on Indian reservations. The Commodity Supplemental Food Program provides support to pregnant women and the elderly. All together, the USDA provides nearly \$60 billion a year. [13]

2.1.2 Massachusetts Emergency Food Assistance Program

2.1.2.1 History

The Massachusetts Emergency Food Assistance Program (MEFAP) provides food products from the Commonwealth of Massachusetts to its constituents in need. In 1995, TEFAP funding was decreased and thus Massachusetts suffered to the tune of 7.5 million pounds of food. In response, Governor William Weld and the state legislature established MEFAP. Currently MEFAP is supplying 842 emergency food providers. The MEFAP organization distributes to food banks around Massachusetts; currently these include the Food Bank of Western Massachusetts, the Greater Boston Food Bank, the Merrimack Valley Food Bank and the Worcester County Food Bank. All together the food banks of Massachusetts serve 114,000 people every week—an annual total of 321,500 individuals. This is a 14% increase since 2001 and now includes nearly 7% of the total population of Eastern Massachusetts. Here is a brief list of statistics concerning MEFAP:

- 34% of the members served are under 18 years old

- 10% of the members served are older than 65
- 69% are women, which is a 35% increase since 2001
- 52% live in rural or suburban areas
- 68% of clients are food insecure (unsure of their next meal)
- 30% experience hunger (being completely without food)
- 64% of the households live below the federal poverty line
- 53% do not have access to a working car
- 55% had to choose between utilities/fuel, rent or medical bills and food
- 23% of households have at least one member in poor health
- 31% have unpaid medical bills
- 16% are homeless, a 27% decrease from 2001
- 44% are high school graduates; 10% are college graduates

The Burlington Community Food Pantry receives aid from the Greater Boston Food Bank (GBFB). The GBFB serves 83,000 people per week and has distributed 24.7 million pounds of food in 2005, a 42% increase since 2001. Of the agencies in the GBFB's service area, it provides to 64% of the pantries, 44% of the kitchens and 51% of the shelters. Satisfaction of recipients is extraordinarily high, 90% were satisfied with the quality and 85% were satisfied with the variety. [11]

2.1.2.2 Funding

The money to pay for MEFAP comes from the state budget of Massachusetts. In 2008, MEFAP cost \$12.1 million. Unfortunately this is a \$1.1 million decrease from 2007, even though the amount of people seeking food has grown significantly. Of this money, \$10.3 million went to the core food purchase, \$550 thousand went to Massachusetts-grown produce and then \$1.2 million went toward administration and operations. The latter is spent mostly on labor for receiving, warehousing, transportation and distribution of the MEFAP commodities. Unfortunately, the food banks must raise private funds to cover their own cost of distribution. "It is crucial to note that the need has outpaced the pounds distributed." MEFAP distributes 15.17% (237 agencies) to the Food Bank of Western Massachusetts in Hatfield, 66.28% (473 agencies) to the Greater Boston Food Bank in Boston, 6.71% (39 agencies) to the Merrimack Valley Food Bank in Lowell and 11.84% (93 agencies) to the Worcester County Food Bank in Shrewsbury. [12]

2.1.2.3 Food Sources

The food that is distributed by MEFAP comes from three locations. Cirelli Foods has a retail and food service contract for 92.5% of the goods purchased. The Pioneer Valley Growers Association—a group of local Massachusetts farmers—receives 5% of the business as a means of helping in-state growers. Finally, 2.5% of the purchased goods are from AG New England which is exclusively holiday poultry, usually turkeys.

There are two purchasing plans by which MEFAP operates. The core food purchasing is the contract that Cirelli Foods was awarded after a competitive bidding process. They are given \$10 million for retail-packed foods, food service and institutional foods. By a similar process, the Associated Grocers of New England, Inc. was awarded the bid to supply the Thanksgiving and holiday turkeys. The effectiveness of this plan comes from the economic support being sent back to Massachusetts' food vendors, facilitating economic development as well as job security. The second purchasing plan is a result of the Massachusetts Grown Initiative. Introduced in June of 1999, the plan aims to give low-income households access to fresh produce. Additionally it opens a new market for local farmers and re-invests state funds in Massachusetts growers. This bid was given to the Pioneer Valley Growers Association at \$528,659. As a result, they now provide high-quality items such as cabbage, onions, apples, corn, eggplant, spinach, potatoes, peppers, squash, collard greens and strawberries.

To determine food purchases, the food banks use surveys and focus groups to develop a product list that is both nutritionally balanced and satisfactory to agencies and clients. Of course, there is an emphasis on purchasing items produced in Massachusetts. The process is supposed to be streamlined with the direct delivery program which bypasses the warehouse, storage, labor and transportation costs. Products such as Goya were included to provide an ethnic variety. An additional 19,300 turkeys and 4,184 hams were distributed between November and December. [12]

2.1.2.4 Clients

The MEFAP food banks have three main types of clients. First, there are the food pantries which are an agency or program that distributes groceries and does not charge anything. The participants must have a declared need such as a Department of Transitional Assistance (DTA) card or Medicaid. The pantries must also do some sort of public outreach such as a food resource referral service or a listing in a social service directory. Second, there are soup kitchens which prepare and serve on-site meals

regularly to those in need. Again they must not charge and have to do public outreach. Lastly there are shelters which regularly provide shelter where those who are homeless are temporarily housed. In addition to the no charge and public outreach, the residency of anyone receiving aid from a shelter must be no longer than six months. [12]

2.1.2.5 Services

The primary service that MEFAP provides is the purchasing of food; any further administration and distribution of goods becomes the responsibility of food banks. However in 1999, MEFAP introduced the Nutritional Education Program that would help extend the overall goal to providing food and nutrition education. Unfortunately some budget cuts in 2003 led to the termination of this program. The funding has yet to be restored.

2.1.3 Feeding America

Feeding America is made up of more than 200 food banks and food rescue organizations that provide the hunger relief to all 50 states in the United States. It provides hunger relief to over 37 million low-income people who are facing hunger in the United States through over 70,000 programs [20]. Feeding America works together to solve the hunger crisis through a conglomeration of individuals both volunteers and paid employees, local food banks throughout all 50 states in America, national offices, as well as corporate and government partners. [22]

Feeding America works nationally with large corporate donors to secure food and grocery products that are distributed to the local food banks in need. This helps facilitate relationships between the local food banks and their local grocery stores through Feeding America. In 2009, Feeding America received over 550 million dollars in contributions and support. This helps fund innovation at the local to help improve ways of securing and distributing food. [21]

Feeding America also strives to standardize care so that food bank members across the nation can be trained both equally and properly so that they can provide the best support possible. This also helps standardize food safety, financial systems, and record keeping as well as transportation and donor relations. Feeding America also raises public awareness of the hunger issue on both the national and local level such as their new ad-campaign about how 1 in 8 Americans face hunger. Feeding America

main purpose is for food distribution throughout the nation to food banks in need. Since Feeding America is a national organization, it can move resources such as food & employees to where they are needed most and strategically help the fight against hunger. [22]

2.1.4 Burlington Community Food Pantry

The Burlington Community Food Pantry (BCFP) was founded to serve as an emergency food supply of non-perishables and to help fight the growing hunger problem in the Massachusetts suburb of Burlington, Massachusetts. It has grown to provide food and other basic necessities to over 193 active families and 308 total individuals in need. The BCFP is volunteer-run organization and has been in operation for 29 years with continual growth. Although it is volunteer-run, the pantry is overseen by a board of directors comprised of community members, representatives from local congregations, a representative from the Burlington Community Life Center and a representative from the Clergy Association. The Burlington Community Food Pantry received support from 38 volunteers in January of 2010 and 65 volunteers in March of the same year.

2.2 Hunger Relief Software

2.2.1 Introduction

The Internet has had a positive impact on the hunger problem because it enables people seeking hunger relief to easily find nearby organizations. Not only can needy people find local support easily, but patrons can also easily donate to local hunger relief organizations online. These websites allow food manufacturers, distributors, farmers, retail grocers, caterers, dining establishments, and individuals to find hunger relief organizations and to donate. The Greater Boston Food Bank uses the eHarvest online ordering and monthly service reporting system and the Food Bank of the Rockies uses the Agency Express software.

Several food rescue programs have been developed in the United States. For example, Dever's Table Food Rescue Program collects excess food from retail establishments and freezes it. The preserved food is then distributed to local agencies that provide support to families in need. Many other food banks, agencies, and organizations have similar programs that are major contributions to hunger relief. The supplying of food is not a burden on the federal or state governments because it

comes from local sources. TableToTable is another community-based food rescue program. It collects prepared and perishable food that would otherwise be wasted and delivers it to hunger relief organizations in New Jersey.

2.2.2 AgencyExpress

Feeding America partnered with Aidmatrix to develop a software solution for all food banks in their network. Every year, 96 billion pounds of food goes to waste in the United States. This motivated the two organizations to seek a solution that would reduce waste by developing an information management system to increase efficiency. The result of these efforts was AgencyExpress, a software package that facilitates the administration of food banks. Through the use of AgencyExpress, more food is being given to the hungry and less food is being wasted. "Each month, our food bank partners around the globe move more than 50 million pounds (26.7 mil kilos) of food per month into the hands of over 35,000 local hunger and relief agencies using our solutions." [23] In addition to AgencyExpress, Feeding America and Aidmatrix have created hunger relief software to optimize communication between food banks, suppliers, and agencies including Choice and DonorExpress. The Food Bank of the Rockies is just one of the food banks that has the AgencyExpress software integrated into their website. Unfortunately, AgencyExpress is not very customizable to individual food banks so some—such as the Greater Boston Food Bank—worked with other partners to develop better solutions.

2.2.3 eHarvest

The eHarvest Online Order and Monthly Reporting system was developed by SCSI Business Solutions, LLC. It allows food banks to manage their inventory and the agencies they support, as well as produce statistical reports. In 2008 the Greater Boston Food Bank "took a giant technological step forward, implementing the eHarvest online ordering system" [16]. Agencies use this online ordering system to get food and make pick-up arrangements from the food bank. As of 2008, more than 600 agencies use Greater Boston Food Banks eHarvest online system to order hunger relief inventory and to report the agencies' own data [17]. The new online eHarvest software that GBFB implemented greatly improves the efficiency of operations; however, not all agencies are equipped with computers to access the online system. The GBFB then created a program to supply agencies with computers so they may use the eHarvest system. The Atlanta Community Food Bank also uses the eHarvest online solution [18].

SCSI released a general food bank solution to be used by any food bank wishing to implement the system [19].

The eHarvest system enormously improves efficiency of operations in food banks, including the Greater Boston Food Bank. "Under the previous process, inventory was faxed or emailed to agencies; orders were returned via fax or email, and changed in appointment times made by phone" [16]. The system improves internal operations within the food bank including managing inventory and the agencies they served while also gathering statistics to receive grants. "With an average of 100,000 pounds of food moving out of the warehouse every day, access to real-time inventory is among eHarvest's biggest pluses for agencies" [16]. The system also benefits the pantry agencies because they can easily order hunger relief supplies online and browse the current inventory. For both food banks and agencies, the system frees up more time to feed people by improving the efficiency of operations.

2.3 Open Source

Open source is a means of licensing software that includes a number of things. The primary objective is public availability of source code. In addition to access to the source though, the software must be free to redistribute. That means there should be no restrictions to selling or giving away the software as well as no royalties paid to the author. It must also allow distribution of modifications and derivations of the source code. The license must not discriminate against persons, groups or fields of endeavor. The license must also not be specific to the product—there are several public ones available such as the GNU General Public License and the MIT License. It must not restrict other software and should be "technology-neutral" such that the license does not address any specific technology or interface. [14]

The open source movement is comprised of numerous organizations and people—not to mention a lot of source code and documentation. A leading organization is the Open Source Initiative (OSI). Formed in the late 1990s by Eric Raymond and Bruce Perens, OSI has roots in UNIX and the hacker culture. It serves as an educational, advocacy and stewardship organization. The purpose of OSI was to build an institution that would represent the open-source community and maintain the Open Source Definition. Another leading organization is the Free Software Foundation, founded by Richard M. Stallman in 1985. The GNU operating system is a project also founded by Stallman, comprised of all free and open software. The GNU project and all the resultant software and documents has been an

enormous contribution to the open source community. In fact, Stallman is credited with starting the "free software movement." [14] [15]

The software package produced by this project will also be released under an open source license. As public domain code, the software will be available to developers working on similar projects and to other pantries which have similar processes. Our source code and distributable software package will be available under the GNU General Public License v3 on a Google Code project page and repository. This will increase the overall potential benefits of the project's software solution, as the goal in the end is to help people.

3. Methodology

3.1 Introduction

The goal of this project is to design and implement an open source software solution to combat the inefficiencies in pantry-level operations and food distribution. To do so, it is crucial to understand the current operations of food pantries, existing software solutions including strengths and weaknesses, and the growing needs of food pantry staff. The objectives of this project are:

- To understand the source of hunger and its prevention
- To research software used by hunger relief organizations
- To investigate current operations of food pantries
- To prepare an acceptable software design improving food pantry efficiency
- To implement the software solution
- To train the project sponsor in using the software
- To make the software open source and publicly available

Document and historical research will be used to understand the source of hunger and its prevention. There are many books, articles, webpages and laws concerning hunger issues and social programs designed to combat hunger issues. Additionally, organizations that develop software in the field of hunger relief provide resources on the web to document their products. Free trials are also usually available when evaluating a specific software package.

The investigation of how food pantries currently operate is best achieved by conducting semi-structured interviews with pantry staff. The inefficiencies this project will be targeting are directly related to the staff being able to accomplish their tasks. To more intimately understand how the pantry operates, observation techniques will be used. By directly observing the pantry staff working, the process of analyzing the needs of the pantry becomes easier and more correct.

Once the requirements are fully agreed upon, it will be time to use software engineering techniques to properly organize a system that will best serve the needs of a food pantry. It is important that the design is easy to use, such that it is not a larger burden to use the software than to not. When trained, it should be easy for the staff to retain knowledge of how to use the system. In addition to the ease of training, it should also be easy to install and setup the software package. With basic

understanding of cognition, user interface design techniques can be used to accomplish the desired all-around ease of use.

3.2 Interview

Where: The Burlington Food Pantry

When: April 3, 2010

With: Kathleen Abouzahra, Pantry Coordinator

Roles:

Ramsey Abouzahra will introduce the team and project

Both team members will take notes

Both team members will write a summary

Richard Pianka will review the summaries for factual and grammatical errors

Target Information:

Objectives of the pantry

Overall operations of the pantry

Processes that are inefficient

Attempted solutions

Expectations of the project

Foreseen problems

Questions:

1. What is the mission of the pantry?
2. What are the short term/long term goals of the pantry?
3. How long have you been helping at the pantry?

4. How would you define your responsibilities?
5. Is there an organizational structure?
6. How does the pantry get funding and resources?
7. What other organizations is the pantry involved with?
8. Tell us about how the pantry actually operates over the course of any given month.
9. Are there other considerations around holidays or the winter months?
10. Which of these processes can be improved?
11. What measures have you taken so far to improve?
12. What can our project do to help?
13. What are the expected outcomes of the project?
14. Do you foresee difficulties or problems we should be aware of?

3.3 Software

The most obvious way to improve the efficiency of the Burlington Food Pantry's processes would be to use software that can properly manage the necessary information and automate tasks where possible. In many cases, a computer can accomplish a task many orders of magnitude faster than a person; crunching numbers, locating records or storing data for long periods of time is far more easily accomplished by a machine. The software would need to keep track of all the client, bag and inventory data currently being used by the pantry. It would also need to generate reports that would be used to fill out paperwork and estimate the necessary food for the following month.

Research into existing software solutions is integral. If there is already an available software package that will fit the needs of the pantry, then it can be used to aid staff in carrying out tasks. The best place to look for software is the Internet. The authors will search the Internet for any existing software that may help the pantry, to further investigate and evaluate whether the option is viable. In the case that the available solutions are not acceptable, the research can still serve as a reference to what has been tried before, how it has failed and where it has succeeded.

3.4 Observation

Accurately understanding the needs of the pantry requires direct observation of the operations in a scenario where the software will be used. This must include the different responsibilities of volunteers such as bagging, deliveries, and signing in clients. The observation will consist of very informal interviews and note-taking as the volunteers perform their tasks. It must also show the current volunteers the current software system to get feedback from the people who will actually use the software.

4. Findings

4.1 Interview

1. What is the mission of the pantry?

To provide 7-10 days of food monthly to Burlington families with a self declared need for assistance.

2. What are the short term/long term goals of the pantry?

Short Term - automation (see project description in Appendix A) with automation volunteers have more time for fundraising which can lead to more nutritional items offered (more produce and protein)

3. How long have you been helping at the pantry?

Three years

4. How would you define your responsibilities?

See Pantry Operation overview (Appendix B)

5. Is there an organizational structure?

There is a pantry coordinator, team leaders, and additional volunteers for the following tasks:

- Grocery Order
- Shopping
- Grocery Pickup
- Tuesday Bagger
- Wednesday Transport
- Wednesday Shelving and Preparation
- Wednesday Delivery Preparation
- Delivery
- Distribution
- Panera Bread Pickup
- Bin Pickup
- Saturday Orders
- Greater Boston Food Bank Order
- Greater Boston Food Bank Pickup
- Administrator / Key

6. How does the pantry get funding and resources?

The BCFP receives resources from the Greater Boston Food Bank and Project Bread. The pantry also receives donated funding and resources from both local food suppliers and community members.

7. What other organizations is the pantry involved with?

People Helping People Inc. and lot of support from town houses of worship

8. Tell us about how the pantry actually operates over the course of any given month.

Open for distribution 2nd and 4th Wednesday 3:00pm to 6:00pm monthly. See overview for details (Appendix B)

9. Are there other considerations around holidays or the winter months?

Increase demand for services. Increase volunteers need for 2-3 food drive donations weekly Nov-Dec. About 8-10 tons total.

10. Which of these processes can be improved?

Determining needed inventory and bagging stats for preparations based on actual data

11. What measures have you taken so far to improve?

Spreadsheets to organize and collect data

12. What should can our project do to help?

Integrate data with reports

13. What are the expected outcomes of the project?

See project description in Appendix A

14. Do you foresee difficulties or problems we should be aware of?

Tremendous product variability and no ability to inventory incoming donations. (GBFB and purchased goods can be tracked)

4.2 Software

A small software company called Dogwood Micro Design Inc. sells a product titled Agency Helper that is designed to help social service agencies such as food pantries keep track of their clients, products and the services provided to those clients. The license costs \$99 per year. The features list coincides with the BCFP's needs surprisingly well. [9]

- Keep client name and address information
- Track the products and services provided for the client
- Identify client TEFAP eligibility (TEFAP income guidelines are stored by the program, and it uses the client's income and number of household members to determine eligibility)
- Print completed TEFAP form for client to sign (in English or Spanish)
- Option to limit the quantity of product or services provided to the client during a time period (week, month, quarter, etc.)
- Track product received into the agency (such as food received from a food bank)
- Options to collect additional client information - ethnic group, marital status, citizenship status, medical insurance, disability status, receiving food stamps, directions to the client's dwelling, names of household members
- Notes field to record any additional client information
- Client history report - all the products and services provided to a client for a date range
- Product/service history - for a given product or service, list all clients that received it during a date range
- Product/service summary - for a given date range, summarize any number of ways (by county, or by county and age group, or by ethnic group by city, etc.) Very useful for grant writing purposes.
- Person count summary - summarize number of clients served. Optional date range, options to summarize by the same options as the product/service summary.
- List all clients meeting user-specified conditions. For example, list all clients over 65 in a specific county.
- Optional "alert" messages for a client to help the agency representative be aware of clients that require special attention
- Developed and supported by a company with over 15 years of support and development for non-profits

Open Source Ministry is a website available at osministry.com. It is an online resource for Christians and technology. On their forums, a member posted a thread about his need for a software system to manage food pantry operations. His post was met with responses from other people operating food pantries who also expressed a need for a management system.

We deal with government supplied food (TEFAP, if you're familiar) and donations from food drives, grocery stores, etc. There are different "qualifiers" to get the food and we have to track income, # of people in the family etc. How often they receive food, etc.

The govt food we receive is never the same from month to month, so we create boxes based on family size and the food we have available.

And we do emergency food boxes for church members and others in demonstrated need that are referred to us from other churches. The boxes are made up from the donated food supplies, again based on what we have available at the time.

Often we supplement the govt boxes with our emergency stock.

So, it's not a "shopping" scenario, but we do need to track personal info on families, and the boxes that the families receive.

And as with many smaller churches, there is no budget for my project.

But the need is great.... [26]

The forum post describes very similar needs to those of the Burlington Community Food Pantry. They do not need to be able to track individual items within the pantry, rather information on each family including members and their age, qualification for aid, and other relevant contact info. The system also needs to track the food bags that each family receives.

4.3 Observation

Observation of operations at the Burlington Community Food Pantry took place on a food distribution day. The BCFP distributes hunger relief packages on the second and fourth Wednesday of every month between 3:00pm and 6:00pm. Bagging of food products is done the days before distribution. On distribution day at 1:00pm, volunteers arrive to pick up the scheduled delivery list of names, addresses, and phone numbers as well as the hunger relief bags. After the deliveries are finished, the volunteers come back to the pantry to prepare for the families coming to pick up bags. All

of the perishable food—dairy, meat, and produce—is prepared for the incoming families because only non-perishables can be bagged ahead of time.

At 3:00pm the doors open and a rush of people enter the pantry. The clients then sign the USDA sheet which verifies their qualification for receiving hunger relief. Their contact information, family information, and other data are also verified and corrections are made. They are then instructed which bag to grab at the end of the line. They take a cart to pick from some available selection of food as they proceed down the line. Then they tell one of the volunteers at the end of the pantry their name and family size, receive the appropriate hunger relief bag and finally exit the pantry.

The BCFP volunteers who currently run the operation were presented with the intermediate design of the software solution. The demo received very positive responses. They gave feedback about the user interface and how to improve it for their needs. They were impressed by how easy it is to look up clients with a simple search of the name. They were also impressed by the easiness to pull up all the detailed family information, update anything outdated, and sign them in with just a click. They also asked for a past-transactions log for the client to which would help detect repeat clients, a problem with which they have previously dealt.

4.4 Conclusion

The Burlington Community Food Pantry is run entirely by volunteers. The volunteers include a pantry director whose role is to oversee all BCFP operations, such as managing the pantry's clients, inventory, budget, and volunteers. This means managing food distribution to families, food inventory including stocking shelves, bagging for distribution, and food acquisition through shopping, donations, food drives, and the Greater Boston Food Bank. The pantry director is responsible for coordinating the other volunteers and making sure the grocery bags are prepared on the first and third Wednesday of each month. The pantry director must calculate an accurate projection of the quantity and contents of hunger relief bags needed for the following month to make sure the inventory is adequately stocked. The pantry coordinator is also responsible for opening the pantry on the 2nd and 4th Wednesday of each month to distribute food to the clients who arrive and to coordinate deliveries to the families who cannot come into the pantry.

The pantry coordinator has several responsibilities involving the inventory in the Food Pantry. The director must audit inventory twice per month, order retail groceries, supplies from grocery stores and the Greater Boston Food Bank. The director must also manage donated items from food drives, local store excess, and from other local donors. Every month, the volunteers must sort through the incoming groceries to stock the shelves.

The Burlington Community Food Pantry has expanded by receiving aid from the Greater Boston Food Bank to accommodate the growing number of families and individuals receiving support. To continue receiving aid from the GBFB, the pantry coordinator must maintain the proper documentation required for the families to receive support. The GBFB requires that food pantries report the number of households, adults, children and seniors served as well as the total number of bags distributed and the percentage of products from the GBFB. This information is used to help obtain grants, donations, state and federal funding, and to raise awareness of hunger in the communities.

In the past year the number of clients the Burlington Food Pantry serves has increased by nearly fifty percent. The pantry currently operates by using a card catalog to manage families. Inventory control is non-existent and statistics reporting must be hand tabulated each time. The pantry is looking to adopt a solution that will help manage a client database and grocery inventory. The solution should also be able to generate grocery lists, contents needed for baggers, and monthly reports for the GBFB.

Naturally, the Agency Helper software package was worth looking into as a possible solution for the BCFP. After requesting and receiving a demo CD from Dogwood Micro, the authors were able to try the Agency Helper. This experience was not nearly as promising as originally hoped. While it does appear all of the features do exist, the software is simply archaic. The interface is anything but intuitive and in some cases more cumbersome than doing the task by hand. There are also many features that will not be used by the pantry staff and will only contribute to the confusion. The last nail in the coffin is the inventory system; unfortunately it is not sophisticated enough to properly capture the bag distribution, one of the most crucial requirements. In light of this assessment, the authors have chosen to design a custom software solution. This decision will allow for greater flexibility in terms of the features, while allowing organization of the interface in such a way that it can be easily understood. The Agency Helper will be a guide in some respects as well as a warning in others. As this will be designed from scratch it can be tailored exactly to the needs of the pantry.

While it is not necessary, it would be best to plan ahead such that other pantries may use this software solution. With this intention in mind, the software can be designed so that it may be installed for separate pantries. In this way, the solution may potentially improve the efficiency of the Burlington Food Pantry as well as other pantries that use similar processes. The exact design will probably not fit perfectly for other pantries; however, the scope of the project limits the scope to only fully supporting the Burlington Food Pantry. Regardless, simply offering the software solution to the public may enable other pantries to improve their efficiency as well. The ultimate goal of the project is to facilitate the helping of people and the solution should be available to all.

5. Analysis

It is imperative in the software design process to understand the goals and characteristics of the system's users. When analyzing users, it is important to note their aspects that may affect their perception of and interaction with the system. These may include age, sex, culture, physical abilities and disabilities, educational background, computer experience, motivation and attitude.

Tasks and goals are somewhat different, but must both be understood when making design decisions. Generally it is important to note the variance, frequency, required knowledge or skills, vulnerability to environment, time restrictions, safety hazards, cooperation and switching of tasks. More formally, tasks are analyzed in terms of actions, actors, objects, decompositions, tools, errors and relationships. The following analyses may exclude some of the characteristics in light of necessity—or lack thereof.

5.1 Investigation

The areas of investigation are the factors that may influence design decisions. These are important during the different analyses as well as in the specification of requirements. In addition to the users and tasks, there are aspects of the system and its operating environments that can affect the design. Below are the areas of investigation on which the project will focus.

Table 1 - Areas of Investigation

Focus of Investigation	Information Gathered
The domain	Hunger relief; food distribution; community service.
The users	Food pantry coordinators and volunteers; potentially others.
User characteristics	Middle-aged Americans with limited computer experience.
Task characteristics	Easy and sometimes repetitive. Ranges from daily to bi-monthly.
Physical environment	May be noisy. Otherwise a generally comfortable setting.
Social environment	Collaborative work in an open-plan area.
Organizational environment	Non-profit volunteer work.
User support environment	General lack of training materials and limited domain experts.
Qualitative usability	Easy to learn and intuitive interface. Consistent user feedback.

aspects	
Quantitative usability goals	None, due to limited scope of the project.
Constraints	Available hardware. Limited timescale for the completed solution.
Trade-offs	Budget costs for student work.

5.2 User Analysis

The primary stakeholders of the software solution are the volunteers at the Burlington Community Food Pantry. The current volunteers are of a certain demographic, but this is subject to change and with consideration for the possibility of other pantries using the solution, a broader range of users will be analyzed. Generally, the volunteers are retirees. However, there are some that are young adults and often in religious-based organizations there will be teenage volunteers.

Table 2 - User Characteristics

Characteristic	Teens/Young Adults	Young Adults/Middle Age	Middle Age/Senior Citizen
Age	12 to 25.	25 to 50.	50 to 80+.
Sex	Male and Female.	Male and Female.	Male and Female.
Physical Limitations	May be fully able-bodied or may have some physical limitations in relation to, for example, hearing or sight. Will be of varying heights.	May be fully able-bodied or may have some physical limitations in relation to, for example, hearing or sight. Will be of varying heights.	May be fully able-bodied or may have some physical limitations in relation to, for example, hearing or sight, mobility or use of hands. May also have memory and focal limitations. Will be of varying heights.
Educational Background	May have minimal or no educational qualifications.	May have only minimal educational qualifications.	May have only minimal educational qualifications.
Computer Experience	Probably have some prior experience of	May have little or no prior experience of computer or	May have little or no prior experience of computer or IT

	computer or IT use.	IT use.	use.
Motivation	Probably very motivated to use the system, relative to a procedure on paper.	Could be very motivated to use the system, especially if they can accomplish their tasks quickly.	Could be very motivated to use the system, but may prefer the traditional paper procedures.
Attitude	Attitudes to use may vary, depending on the reason for volunteering and the reliability of the system.	Attitudes to use may vary, depending on the reason for volunteering and the reliability of the system.	Attitudes to use may vary, depending on the reason for volunteering and the reliability of the system.

5.3 Task Analysis

Tasks and their characteristics are important in user-centered design. Since the purpose of this software is to increase efficiency and ease-of-use, it is crucial to understand and improve the actions performed to complete a task. These characteristics influence the decisions made in relation to user interface design. Here is another analysis for the available tasks and their attributes.

5.3.1 Task Objects

Task objects—or primary task objects—are the units of information and data with which the users interact to carry out their tasks. They are high-level objects, central to the tasks the users will carry out. Typically there are few task objects. These details help shape the concrete data that must be captured by the system.

Table 3 - Client Object

Task Object	Attributes	Actions
Client	Name	View
	Gender	Add
	Phone number	Print

	Address	Save
	Date of birth	
	Family members	Edit
	Active	Pickup
	Delivery	Delivery
	Pickup date	
	Financial aids	
	Bag	

The user is able to manage a client's name, gender, phone number, address, date of birth, and family members. He or she must also be able to keep track of which members are active to ensure accurate reporting. In the case of the elderly or mothers who cannot leave the house, clients can be marked as either delivery or pickup. This allows for custom lists of clients who are active and are picking up on a certain date so they can be signed in by a pantry volunteer as the client walks in. Any client information can be updated at this time. A list of all active delivery clients and their addresses, phone numbers, and hunger relief bags can be generated for the volunteer who does the deliveries.

Table 4 - Bag Object

Task Object	Attributes	Actions
Bag	Name	View
	Product list	Add
	Food sources	Print
		Delete
		Save
		Edit
		Pickup
		Delivery

A hunger relief bag is named and has a list of products with quantities and notes. These bags are tailored for family size and dietary restrictions such as diabetes or allergies. The user must be able

to view the list of current bags, be able to create new bags, delete bags, and of course edit existing bags. When editing bags the user can add products to the bag and define the food sources of the bag's contents with their appropriate weight and cost. The user must also be able to print a list of all the bags, theirs products, and the quantity of each bag needed to be created on bagging day.

Table 5 - Product Object

Task Object	Attributes	Actions
Product	Name	View
	Notes	Add
	Quantity	Print
		Delete
		Save
		Edit

The pantry volunteers must be able to manage the products and quantity currently available in the inventory. They must also be able to view the list of current products and edit the quantities of the products and add new products to the current inventory. Any products in the inventory can be added to a bag.

Table 6 - Settings Object

Task Object	Attributes	Actions
Settings	Financial aids	View
	Food sources	Add
		Print
		Delete
		Save
		Edit

Users must be able to view, edit and delete the food sources. Food sources might include donations, purchases, the Greater Boston Food Bank or Project Bread. The food sources will be displayed under bag management, so each bag can be associated with the weight and cost from each food source. Users must also be able to view, edit and delete the financial aid sources. The financial aid sources might include food stamps, social security and welfare among others. The aid sources will now show up under client management so each client can have sources of aid received for use of qualifications of services provided by the pantry.

5.3.2 Task Examples

Below are tables that outline the major tasks that can be performed while using the system. The characteristics of tasks included are the frequency, required skills and knowledge, environmental effects, time constraints, switching between tasks, user collaboration, necessary actions, the related tasks and task objects as well as any potential errors.

Table 7 - Add/Edit Client Task

Add/Edit Client	
Frequency	Often during delivery days when clients are entering
Skills and knowledge	Need know client information to update in database.
Environmental effects	Yes, if it is a bag distribution day many clients are entering and leaving so this is optimal time to update client information.
Time constraints	It is time critical during bag distribution day since many clients are entering and leaving. When updating client information over the phone it is less time critical.
Task switching	The user may switch between Client List, Client Add, and Client Editing
Collaboration	Usually done with a client
Actions	<ul style="list-style-type: none"> • Search for client to edit • Bring up detailed client information • Update client information • Save client information
Task objects	<ul style="list-style-type: none"> • Client • Bag

Related tasks	<ul style="list-style-type: none"> • Product
	<ul style="list-style-type: none"> • View
	<ul style="list-style-type: none"> • List
	<ul style="list-style-type: none"> • Edit
	<ul style="list-style-type: none"> • Save
Errors	<ul style="list-style-type: none"> • Out of date information

Table 8 - Sign-in Task

Sign-in	
Frequency	Sign-in is required for every client that enters the pantry for a pickup which happens on 2nd and 4th Wednesday of every month during the 2 hour pickup window.
Skills and knowledge	Must know or ask the name of the client to sign-in.
Environmental effects	There is a rush of clients entering the pantry at the same time so volunteers may be moving around helping various clients.
Time constraints	User will be in a hurry because there will be a line of incoming clients ready to sign-in and pickup their bags.
Task switching	The user may switch to editing client information to update anything that is out of date.
Collaboration	Volunteers may be switching who is signing people in and the bag distributor is in charge of handing bags out after sign-in.
Actions	<ul style="list-style-type: none"> • Search for the client by name • Verify/Update Client Information • Click to Sign in the client
Task objects	<ul style="list-style-type: none"> • Client • Bag
Related tasks	<ul style="list-style-type: none"> • Edit client • Distribute bag
Errors	<ul style="list-style-type: none"> • Select wrong client • Typing mistakes

Table 9 - Print Delivery List Action

Print Delivery List	
Frequency	Every bag distribution day where deliveries are need to be made, which is twice a month.
Skills and knowledge	A printer is required
Environmental effects	There is a rush of clients entering the pantry at the same time so volunteers may be moving around helping various clients.
Time constraints	Yes because deliveries are done before pickups and volunteer staff is needed to help with the busy bag distribution day.
Task switching	Not applicable.
Collaboration	One volunteer will print the list of deliveries and another volunteer will take the list and the bags and drop the deliveries to the clients.
Actions	<ul style="list-style-type: none"> • Print Delivery List • Get the bags required for delivery • Take delivery list + bags and delivery them
Task objects	<ul style="list-style-type: none"> • Client • Bag
Related tasks	<ul style="list-style-type: none"> • Edit client • Edit bag
Errors	<ul style="list-style-type: none"> • Giving the wrong person the wrong bag • Forgetting to bring a bag for a client • Out of date address or phone number

Table 10 - Print Bag List

Print Bag List	
Frequency	The day before bag distribution day so the volunteers can create all the required bags for distribution.
Skills and knowledge	A printer is required
Environmental effects	There is a rush of clients entering the pantry at the same time so volunteers

	may be moving around helping various clients.
Time constraints	Not applicable.
Task switching	The user may switch between Bag List, Bag Editing, Client Editing, and Inventory.
Collaboration	One volunteer will print the list of bags, their contents, and the number needed for active clients. The volunteers will then use this list to make the appropriate number of various bags.
Actions	<ul style="list-style-type: none"> • View Bag List • Print Bag List • Create the bags for pickups/deliveries
Task objects	<ul style="list-style-type: none"> • Client • Bag • Product
Related tasks	<ul style="list-style-type: none"> • Edit client • Edit bag • Print delivery list
Errors	<ul style="list-style-type: none"> • Out of date bag contents or quantities • Out of date information of which clients are active • Out of date information on which user gets which bag

Further task analysis resulted in the core tasks of the pantry volunteers. Editing clients allows any contact information, qualification for aid and whether they are active to be updated. Signing in clients is used to keep accurate logs of active members and to verify client information when they are present. Printing the delivery list is used to generate view all the clients alongside their addresses, phone numbers, and food bags that receive delivery on distribution day. The printing bag list is used on the day before bag distribution day so the volunteers can prepare the correct number of food bags with their appropriate contents for all the various clients.

5.4 Requirements

The Institute of Electrical and Electronics Engineers defines a standard for software requirement specification documentation in IEEE 380. Many organizations have modified this standard to more closely fit their software development operations. This project has chosen to model its software requirements specification on a template provided by Process Impact. The template was specifically chosen because it closely fits the desired organization of requirements by the authors. Additionally, permission is provided to use, modify and distribute the document. It therefore also meets the open source goals of this project. [27]

5.4.1 Features

The features are high level summaries of the significant functions that the software system must perform. These functional requirements are the major services required of the final product. The features of this desired software system are client management, inventory management, food management and report generation.

5.4.1.1 Client Management

The client list allows the user to keep track of families and their members. In addition to basic contact information, the system must also capture the different financial assistance sources a family receives, whether they pick bags up or have them delivered, which bag they receive, when they are scheduled to receive aid, when they started receiving aid and any dietary restrictions. This feature is of high priority.

To add a client, the user will first enter the very basic information required. The user will then choose to save. This action will create the new client and bring the user to the edit page where they may choose to fill out additional information. To add a member to a client's family, the user will type in the name, DOB, select the gender and press the Add Member button. The page will automatically update with the new member. To locate a family, the user should be able to filter the list by a search query.

All of the input fields must be validated for their format. If any of the formats are incorrect, a popup window will appear with directions to fix the input. Additionally, any changes will be noted. If a

user tries to leave a page after having edited information and has not yet saved, a popup window will appear confirming that he or she would like to discard any changes made.

5.4.1.2 Inventory Management

The product list allows users to keep track of food items and their quantity. The products only store a name and quantity—no other information is vital to the system. Each of the bags maintains a list of products and their quantities in that bag. The bag must also be linked to food sources by weight, to allow for reporting later on. The user must be able to create and manage all of the inventory information. This feature is of high priority.

To create a product, the user will enter the name and quantity and then choose to save the product. To delete a product from the inventory, the user will first click the delete button on the product list and then confirm the popup window that cautions of the deletion. To edit a product in the inventory, the user will first click the edit button on the product list. The user may then change the name or quantity and choose to save. The save action will be confirmed by a popup window.

To create a bag, the user will enter the name of the bag and then choose to save the bag. This action will create a new bag and bring the user to the edit page for the new bag. On the edit page, users can edit the weight associated with food sources and manage its product list. To add a product to a bag, a user will be able to select from a filterable list of the inventory, type in the quantity and choose to add it. Additionally, the user can remove a product from a bag by clicking the remove button and confirming a popup window. The product quantities should also be editable by clicking an edit button next to the product in the list, typing the new quantity, choosing to save and confirming a popup window.

All of the input fields must be validated for their format. If any of the formats are incorrect, a popup window will appear with directions to fix the input. Additionally, any changes will be noted. If a user tries to leave a page after having edited information and has not yet saved, a popup window will appear confirming that he or she would like to discard any changes made.

5.4.1.3 Food Management

The system must capture food as it enters the pantry and as it is distributed to clients. The granularity of the transaction need only be as small as the weight per food source distributed.

Transactions consist of bags delivered, bags picked up and commodity drop-off shipments. Each transaction must be represented in terms of the weight of food per food source.

To sign a pick-up client in, the user will first navigate to the Pickups page. The user will filter the list and then select the desired client. He or she will be brought to a summary page to verify any information about the client. The user can then choose to switch to the task of editing that client or to complete the sign-in process. Once the sign-in is complete, the user is brought back to the Pickups page.

The exact same process is available for delivery clients. However, the delivery clients are accessed via the Deliveries page. The reason for this is to distinctly separate tasks and reduce reliance on the user's memory. This is further justified in 5.4.2.1 User Interfaces.

5.4.1.4 Report Generation

Reports are ways of viewing composite data, trends over time and projections for upcoming months. The Burlington Food Pantry is required to provide monthly service reports to organizations such as TEFAP, MEFAP, the Greater Boston Food Bank, and Project Bread to gather accurate statistical information of the hunger problem and to continue receiving aid. Monthly service reports typically require the following information from food pantries:

- Total number of households served
- Total number of adults (18-64) served
- Total number of children (under 18) served
- Total number of seniors (65 and older) served
- Total number of clients served
- Total number of bags or boxes distributed

Various agencies might require additional information, however. Therefore the system must allow users to be able to extract other statistics from the data. It must contain the additional features:

- Filter complete list of clients by attributes, displaying totals
- Get a list of clients marked active who have not received support in at least 3 months

To view a report, the user will simply select from a list on the navigation menu. This action will bring the user to a page displaying the generated report chosen, calculated from the most recent data in the database.

5.4.2 External Interface Requirements

5.4.2.1 User Interfaces

The interface must be given special consideration due to the frequent interruptions during tasks and necessary accommodations for elderly users. Since users may commonly stop and resume a task, it is important to make the user immediately aware of which task they are performing. Many of the interface elements will be similarly styled lists, tables and widgets. Without additional visual indicators, it may be easy to confuse two tasks.

Furthermore, elderly users may have limited computer experience and possibly physical impairments related to vision. To reduce strain and frustration, fonts will need to be larger than typical websites. Additionally, there should not be any hidden elements to reduce confusion. This means no tabs or sliding content. Popup menus are an exception.

5.4.2.2 Hardware Interfaces

The system requires few hardware interfaces. If the users plan to network and utilize multiple computers with the system then a LAN, Internet connection or possibly both will be necessary. Certain tasks require a printer. This can be supplied in the form of a serial port, USB or wireless device. Naturally, the sufficient hardware required to actually run the software must be available. This means at least a personal computer with a monitor, mouse and keyboard are necessary. In a larger, more permanent setup the software package may exist on a server that is exposed through the LAN or the open Internet.

5.4.2.3 Software Interfaces

The system must be compatible with all of the major operating systems. It will need to connect to an open source SQL-based database instance to store any and all data. It must be easily accessible—

given the proper hardware, of course—by other computers in the pantry or on the Internet. The system should use open standards to easily integrate with existing software on users' computers. All of the required software for interfacing should come in a single package along with the system itself.

5.4.2.4 Communications Interfaces

The primary communication interface that this system will use is the HTTP protocol. This allows for standard communication between a web browser and a web server. Using a web environment will enable seamless scalability as well as provide the power behind both server-side and client-side scripting. The web forms will submit data using the POST method. Additionally, the package will be available with FTP access to allow for maintenance and remote management.

The PHP scripts will use SQL as a communication interface with the database. The standard PHP libraries contain underlying functionality necessary to execute SQL queries. The use of SQL is very common, intuitive and well proven in technological industries. There exist common attack vectors against SQL-based systems that will be further addressed under the security requirements.

5.4.3 Non-Functional Requirements

5.4.3.1 Performance Requirements

While the tasks performed by users are not time critical in the strictest sense, they must be completed in a reasonable and acceptable period of time. No part of the system should ever hang on a process. While the scope of the data will likely be easily manageable, queries should be written properly and indexes created where appropriate. Simple programming techniques and code analysis should be employed to ensure the processing time and efficiency is adequate.

It is unlikely that performance will cause any problems if the software packages are lightweight and well designed. In most cases, the system will be running and accessed through a user's local machine. This approach will entirely avoid any network or Internet latency typically associated with web-based software.

5.4.3.2 Security Requirements

Web-based software has more security issues than regular applications because there are so many more attack vectors at each stage in the request/response transaction. To protect client confidentiality, a login will always be required before accessing the system. However, this protection is not security itself. The two main methods of attack to be concerned about are SQL injection and cross-server scripting. It is crucial that the code prevents both of these if it is to be used on the open internet. User input must be rigorously sequence escaped for SQL attacks before being sent in a query to the database. Additionally, any data already in the database must be rigorously sequence escaped for any HTML that could allow an attacker to execute code in a user's browser. Aside from the inherent flaws in web infrastructure, there are no other noteworthy security concerns regarding the software.

5.4.3.3 Software Quality Attributes

The desired software quality attributes are adaptability, availability, maintainability, portability, reliability, and usability. Adaptability is important because the software is aimed for use by more agencies than just the Burlington Community Food Pantry. The software will be released under an open source license, so availability will also be a focus. Maintainability and portability are both to allow other developers to shape the software in a way they best see fit. Usability is the most important quality attribute in user-centered design, especially when the goal is to improve efficiency of a user's task performance.

6. Results

The name of the software package is Open Pantry, chosen because it is both open source and built to serve food pantries. Development of the system will be in a web environment using all open source and free platforms.

6.1 Design

The Institute of Electrical and Electronics Engineers defines a standard for software design specification documentation in IEEE 1016. Many organizations have modified this standard to closely fit their software development operations. This project has chosen to model its software requirements specification on a template provided by The Kurth Zone. The template was specifically chosen because it closely fits the desired organization of design elements by the authors. [28]

6.1.1 Considerations

6.1.1.1 Constraints

Food pantries typically have a small budget and are run by volunteers. Often internet connections and computers are not readily available. Therefore the system should be flexible enough to run on a single computer without an internet connection as well as with a LAN or Internet connection across multiple computers. Some volunteers may not have strong computer skills so the software must be easy to use.

6.1.1.2 System Environment

Open Pantry will be built using the XAMPP package, a combination of the Apache web server, MySQL database engine, PHP server-side scripting and a few other services. The XAMPP package will be distributed alongside the Open Pantry software. The reason for this is that a single computer with no internet connection can install and use the software. However, a pantry with more funding or more technology could set up the software on one computer and use it from other computers on the network. Furthermore, it is possible to expose this software to the open internet and allow management from anywhere in the world. The project will be hosted on Google Code and released

under the GNU General Public License v3. The XAMPP package is available for Windows, Linux, Mac and Solaris. This will allow use on almost every personal computer and server in the world.

6.1.1.3 Design Methodology

The methods undertaken to formulate the design of this software are based on universally proven techniques. The first technique used is divergence, exploring possibilities and constraints of situations by applying critical thinking. The second is transformation, redefining the design specification as new information emerges. The third is convergence, prototyping scenarios and integrating results that will improve the original design situation. The fourth is sustainability, managing the process of exploring and redefining design solutions over the lifetime of the software. The final technique is articulation, the formal art of visually representing the relationships between components within the architecture.

More specifically, the software design process will combine both the functional paradigm and the object-oriented paradigm to achieve the best organization of code. The two most important design principles to which the software adheres are the reusability and separation of code. In web development, it is all too common to find two, three or more different programming languages in the same source code file. This pitfall must be avoided at all costs. Use of procedural decomposition and object analysis will guide the code structure to most effectively apply these desired design principles.

6.1.1.4 Risks

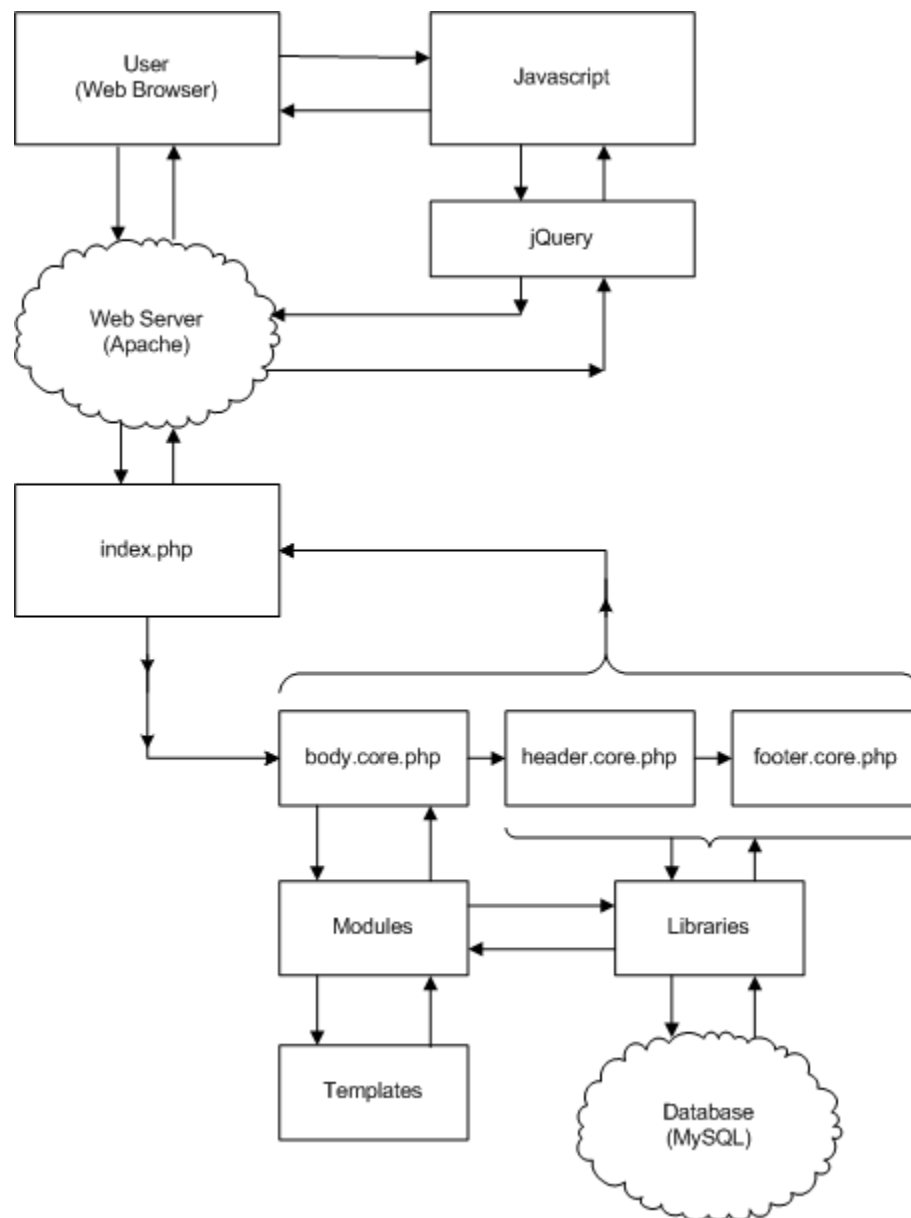
One of the major risks facing the design is possible loss of data and data integrity. This can cause decisions by the food pantry volunteers to be made based on incorrect information. Failure to keep up to date which clients are active may cause improper preparation for distribution day leading to too many or too few hunger relief bags. Validation of entered data as well as user warnings must be displayed to ensure that the integrity of the data is maintained.

6.1.2 Architecture

6.1.2.1 Overview

The skeleton of the code is a very raw, custom PHP framework developed prior to this project by Richard Pianka. The organization of the code is open-ended, covering only the very basic operations that are common between all websites. The framework is organized with the Model-View-Controller design pattern in mind. The flow of execution is below, starting with the User making a request to the Web Server.

Figure 1 - Architecture Control Flow



The web browser will first request a web page resource. As far as the browser is concerned, all of the URLs will be of a directory structure without a GET query string. However, using `mod_rewrite` in the Apache `.htaccess` files, the directory structure is expanded to individual GET query variables and passed to the root `index.php` script. All requests will first pass through this index script. The index is responsible for initializing all of the subsystems that will compute logic and render the final page.

6.1.2.2 Core

The core is the base subsystem that utilizes the other sub systems to build the major components of every page. The core is made of three pieces: the header, the body and the footer. Every page will always load and run each piece of the core. Naturally, the header and footer are responsible for the top and bottom portions of the page. The body loads a module at run-time that will compute logic and build the page content. Each piece chooses what HTML to render in its respective component depending on the GET and POST data sent to the server.

6.1.2.3 Modules

Modules represent the Controller aspect of the Model-View-Controller design pattern. They are responsible for handling the GET and POST data sent to the web server in the HTTP request. Depending on the actions indicated by the GET query, a module will choose which library functions to call and which templates to build. The GET query contains a series of commands that specify the pages to display, actions to perform and records to retrieve or modify. Based on these commands, the module will execute queries to update and retrieve information from the database. With this information it will then fill templates with data. Once the module has constructed all of the necessary HTML code for the body component, it will roll it up to the core that will roll it up to the index. The index will echo all of the final HTML code to the browser via an HTTP response.

6.1.2.4 Libraries

Libraries generally contain the communication interfacing between the Model and Controller aspects of the Model-View-Controller design pattern. Officially, the Model is actually the MySQL database. Libraries are usually associated with modules for organizational purposes. Additionally,

some libraries depend on other libraries. Circular dependencies are avoided. The libraries are created and organized to increase cohesion and decrease coupling.

6.1.2.5 Templates

The template sub system is used to build the View aspect of the Model-View-Controller design pattern. The primary purpose of using templates is to separate the HTML code—used for the View—from the logical PHP code—used for the Controller. For sheer flexibility, templates can contain rudimentary logic but this practice should be avoided at all costs. The template system is actually a library itself that contains the necessary functionality for loading and parsing the template files. However, the template method is so crucial to the architecture that it is classified as a sub system.

The template parsing works by programmatically replacing keywords in HTML. Keywords are denoted by specially formatted tags. An example might look like this:

```
<b>  
    <%%text%%>  
</b>
```

Inside of the `` HTML tag is a keyword tag of the name *text*. There are no standard HTML tags that start and end with a double percent-sign. The sub system will load a template file, take in a set of key-value pairs, replace each keyword tag with the corresponding value in its key-value pair and provide the final HTML to the rest of the PHP code. The main purpose of the template subsystem is to allow reuse of HTML code while also separating it from the server-side logic in the PHP code.

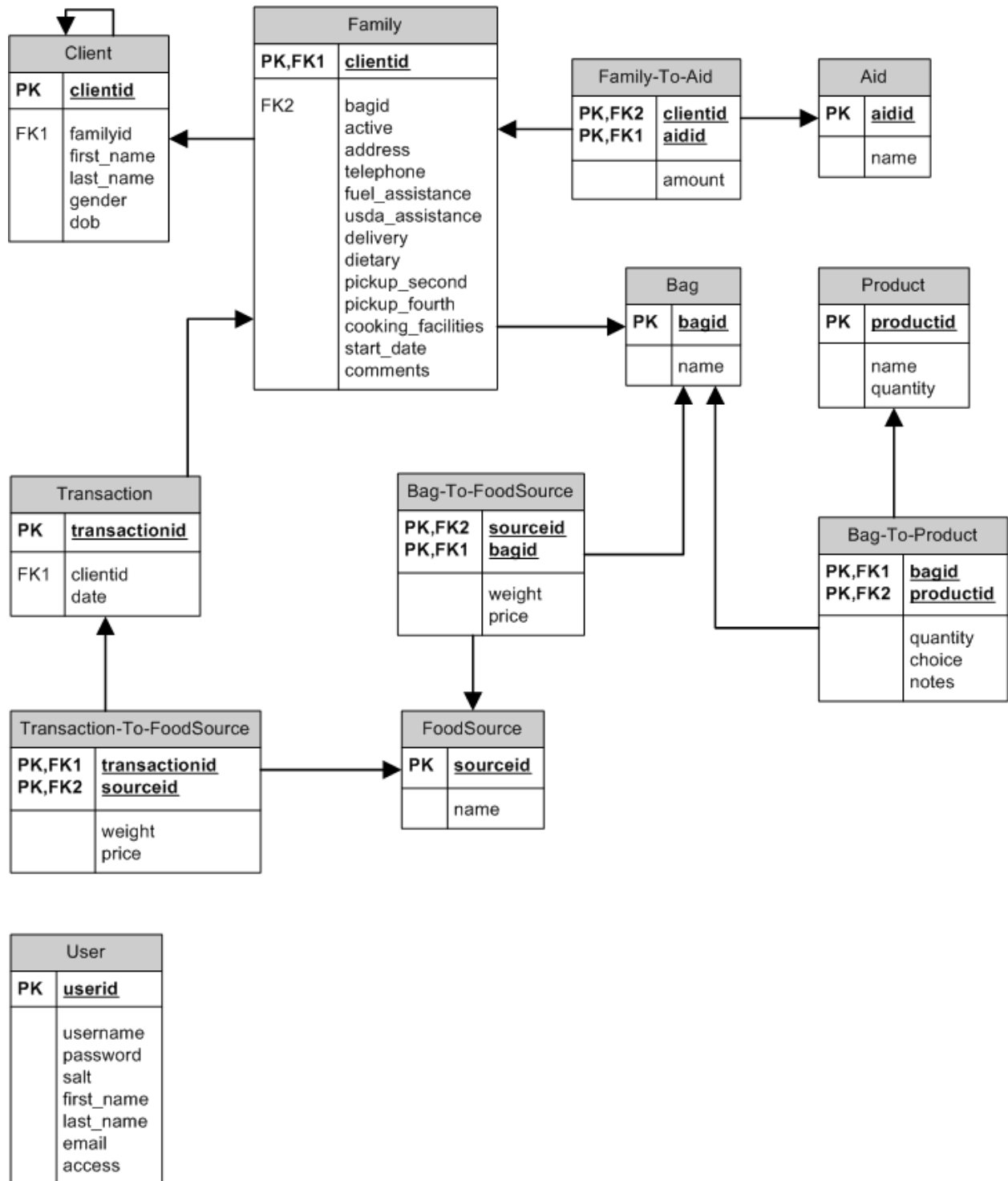
Templates can be nested. For instance, one template may contain the code for a table that will display a list. Another template will contain the code for a row in that table. The logical PHP code can then iterate through a list, parsing the template for the row each time with data from the list. When it has accumulated all of the rows, they are placed in the table template for parsing. In this way, there are a number of templates can be placed inside of another template. Typically, this table template will be placed in a larger template that will also contain the rest of the page—such as the header and footer.

6.1.3 Database Schema

The database schema is in the form of an Entity-Relationship (ER) diagram. For simplicity, the diagram neglects to indicate the cardinality of relationships or the data type of fields. Some of this

information will be further explained below. However, the diagram does include all the field names, foreign keys, primary keys and dependencies.

Figure 2 - Entity Relationship Diagram



6.1.3.1 Tables

There are twelve tables in the database schema. The tables that store objects are Client, Family, Bag, Product, Aid, FoodSource, Transaction and User. The remaining tables Family-To-Aid, Bag-To-Product, Bag-To-FoodSource and Transaction-To-FoodSource are used to model the many-to-many relationships between certain objects. Every primary key in the Family table must also exist in the Client table. This person is the primary client for that family.

6.1.3.2 Relationships

The Client table has a self referencing foreign key. The *familyid* field points to the primary key of another client row, which must have a corresponding *clientid* in the Family table. This design choice was made to reduce unnecessary data storage by pivoting the Family from the Client. When populated, the families and clients form a hierarchical tree that is one level deep. The rest of the relationships and dependencies are apparent in the ER diagram.

6.1.3.3 Data Migration

The Burlington Community Food Pantry staff currently keeps their records in Microsoft Excel spreadsheets. The data in these spreadsheets must be extracted, transformed and loaded in order to populate the database. Once populated, the database will contain the existing clients, bags and products. The Microsoft Excel spreadsheets were exported as CSV (comma-separated values) files. Then a PHP script parsed these files to import the clients, bags, and products into the database by mapping the columns of the spreadsheet to fields in several different tables. The two main spreadsheets that were imported are the Master Client Database and the Family Size and Restricted Diet Bags which contain the clients and product list, respectively.

6.1.4 High Level Design

6.1.4.1 Login

Open Pantry will require a login before use. This will protect the data from anyone who should not be using the system. Also, if the software package is expanded to allow different types of users, it can easily accommodate any changes. For now, the software need only keep track of administrators

(the pantry coordinator) and staff (the pantry volunteers). However, the user permissions are stored in such a way that each user can be given individual access to each portion of the site. For example, it would be very easy to create a new module for food suppliers and create accounts with access to only their new module. The accounts will be managed by administrators only; people will not be allowed to register their own accounts.

6.1.4.2 Food

The food management process is integral to the use of this system. The food management is based on the transaction logs. Food comes into the pantry by drop offs and purchases; and food leaves the pantry by deliveries and pickups. The transaction logs—as indicated by the fields in the database—are stored by weight of the food in relation to food sources. This is because it is simply infeasible for the pantry volunteers to count each product as it comes into or leaves the pantry.

6.1.4.3 Clients

The clients are central to the system. There are a number of pages available to manage the client list. First, there is a searchable list of families that includes some basic information about the primary client and the family itself. Certain families are color-coded to indicate inactivity, delivery or dietary restrictions. The colors used are the same that the BCFP has always used; a legend is provided. From the list, the user can choose to edit any of the visible families. Once editing a family, the user can change any information about the primary client and contact information. Additionally, the user may add, remove and edit other family members. The user can also specify the financial aid sources of that family. The user can also start by creating a new client. This page only allows the primary client and contact information to be filled out. Once the user submits this page, the client is created and the browser is redirected to the edit page for that client where the rest of the information can be entered.

6.1.4.4 Inventory

Inventory management is used to keep track of the products that are available in the food pantry. There is a page that renders the list of products and their quantities. There is also a search box used to filter specific products and allow quick access to information. The user can update the quantity

of any product and keep the system inventory up to date. The user can also create new products to be added to the inventory. A user has the option to delete old products, but is prompted with a confirmation window before processing removal from the inventory.

6.1.4.5 Bags

The bag management is an important component of the system. The main page is a list of hunger relief bags that include information on how many active clients require that bag, the number of items in the bag, the weight of products in the bag, and the total cost of the bag. This page allows users to edit existing bags, create new bags, associate a bag with a client family and delete unused bags. Once editing a bag, the user can update the products and quantities stored. The user can also add new products to the bag through an autosuggest box that finds products in the inventory by name. Lastly, the user can set the food sources of that bag, the corresponding weights and costs to allow for accurate reporting.

6.1.4.6 Reports

Pantries are required to do monthly and yearly reporting of statistical information about the clients served. For monthly service reporting, the total number of households, adults, children, seniors, clients, and bags distributed during the last month as well as the predicted current month must be calculated. The Active Clients page shows the total number of clients scheduled for pickups and deliveries on the different distribution days, as well as the same information from the previous month.

The Grocery List shows page displays the products and quantity scheduled to be distributed this month as well as the name and number of products distributed last month. The Food Source Distribution report displays the total food in weight and percentage that come from each of the food sources. This report shows both the scheduled weights and percentages for the current month and the previous month's break down.

6.1.4.7 Settings

The settings pages allow the user to manage the financial aid sources and food sources that are used by the food pantry. The financial aids page displays a list of various financial aid sources and

whether they are USDA qualifiers or just pantry qualifiers for, information required for reporting. Any of the financial aids can be edited or deleted; this page can also be used to create new aid sources. The food source management page is similar to the financial aid sources in that it lists all current food sources used by the pantry and allows for editing, deleting, and creating new sources. Typical food sources are donations, purchased goods, GBFB (MEFAP/TEFAP), and Project Bread.

6.1.5 Low Level Design

6.1.5.1 Login Module

The login module has the render login function which loads the template for login containing the username and password fields as well as the login button. When the login button is clicked, the page is posted to the login module as a sign-in with the username and password to be validated against the database. If the login is successful the browser is redirected to the home page, otherwise the login fails and the browser is redirected back to the login page.

6.1.5.2 Home Module

The home module renders the main header with navigation menu as well as the large icon linking the individual tasks. It does this by loading the home framework template which contains all the HTML, CSS, and JavaScript code for the layout and navigation menu.

6.1.5.3 Client Module

The client module has a render all families function which queries the list of families from the database and loads them into family list and row templates. The client module also does this for just active pickup families and just active delivery families on separate pages so they can be checked in. The client module has a render new function for creating new families which loads the new family template and handle the save request. Likewise, the client module also has a render function for editing existing families.

6.1.5.4 Bag Module

The bag module has a render all bags function that queries all bags—using a library function—and loads them into the bag list and row templates. The module has a render edit bag function which allows editing of the food sources and products of the bag. It uses AJAX to edit the bags products and receives POST requests for the name changes and the food source changes. When the save request is received, the module calls the appropriate library function to query the database and save the edit. The render new bag function renders a form, receives the user’s save POST data and then creates the new bag using another query from the bag library.

6.1.5.5 Inventory Module

The inventory module has a render all products function which queries the list of products and loads the data into the product list and row templates. The module also has a render new product function which allows for the user to enter a product name and quantity and click the save button. The module then handles a POST to the render new product and queries the database to save the new product. The module’s render edit product function works similarly but repopulates the name and quantity with the modified database information.

6.1.5.6 Reporting Module

The reporting module has four main render functions. The first is the render monthly service report function, which queries the database using multiple client and transaction library functions. The second is the render active clients report function, which gets the active clients using the client library. It then loads the report list and row templates, and displays all the pickups and deliveries expected for the upcoming month. The third main reporting function is the render grocery list function, which queries all the bags of active clients and last month’s clients as well as their contents and quantities to get the full list of products needed for this month. This is displayed against the real number of products that went out last month. The data is then loaded into the product list and row templates. The last reporting function is the render food source report which queries the list of food sources, the active clients, and the past months bag transactions to tally up the break down by weight, cost, and percent of the products in the bags distributed.

6.1.5.7 Aid & Food Source Modules

The aid module has two main render functions. The first render function is for rendering all financial aid sources. This function first queries the list of aids from the database using a function from the aid library. It then loads the template for the list and rows and populates them with the available aid sources. Each row has an edit icon and delete icon next to it. When the edit icon is clicked the name of the financial aid becomes editable and the edit icon turns into a save icon. This is done by making a JavaScript request to the modules render edit function which returns the rendered HTML of the save icon and textbox, repopulated with the existing financial aid source name. The user can then edit the name of the aid and click to save the changes via an AJAX request to the module. When the delete icon is clicked, the user must confirm a warning of the deletion. The module then receives a POST request containing the aid to be deleted and executes delete query on the database. The food source page works very similarly but uses slightly different queries from another library.

6.1.6 User Interface Design

Modern techniques in the web environment will also allow Open Pantry to have an easily malleable interface. Javascript and AJAX will play an important role in the friendliness of the web pages. By easily changing interface elements, the software can intuitively respond to the user.

6.1.6.1 Overview

We will use the jQuery Javascript framework to aid in speedy and reliable development. The trade-off between development time and a quality interface is significantly less prominent with the power of these tools. The platform and design decisions thus far are made to minimize any costs for running the software package, make Open Pantry scalable to any reasonable amount and network of users, and to create an interface that will be easy to manipulate, use and understand.

6.1.6.2 Header and Menu

A bar is placed on every page which has a menu that allows for easy navigation between tasks. There are six main sections on the navigation menu: Home, Food, Clients, Inventory, Reporting, and Settings.



The first is the Home navigation item that brings you to the home page. The Food menu contains a dropdown for Pickups, Deliveries, Drop Offs, and All Records. The Clients menu contains a dropdown for the Family List and Create New Family. The Inventory menu contains a dropdown for Bag List, New Bag, Product List, and New product. The Reporting menu contains a dropdown for MSR Summary, Active Clients, Grocery List, and Food Source Distribution.

6.1.6.3 Page Icons

Page Icons were used as a graphical representation of the task being done so the user can easily be reminded of what page and task they are on. Below are the icons and their corresponding task areas. These appear on the home screen and on every screen associated with that task area.



6.1.6.4 List Filtering

In order to provide quick and easy access to information the lists are searchable using a textbox. As the user types into the search box, the resultant list is one that is filtered down to only results matching the search query. List filtering is a significant improvement in the speed of finding a particular client out of the entire list of clients since instead of scrolling through the entire list. This feature alone greatly reduces the time required to sign in a user.

6.1.6.5 AJAX

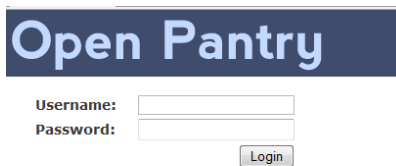
In order to avoid disrupting the program's flow, AJAX is sometimes used rather than full page reloads. When there is a list of products in the inventory or in a particular bag, AJAX is used to allow inline editing of those products and their quantities. On the edit client page, AJAX is used to be able to add additional family members, and edit their information without any page reloads. This decision gives the user a more natural experience while still providing the necessary functionality.

6.3 User Manual

6.3.1 Login

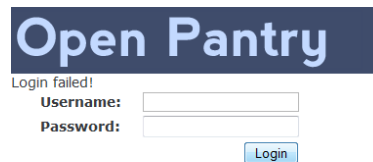
Navigate to <http://localhost/pantry> in Mozilla Firefox and enter your username and password. The default username is `root` and the default password is `root`.

Figure 3 - Login Box

The screenshot shows a web interface with a dark blue header containing the text "Open Pantry" in white. Below the header, there are two input fields: "Username:" and "Password:". To the right of the "Password:" field is a "Login" button.

If an invalid username/password pair is entered the following screen will appear.

Figure 4 - Login Box Invalid Login

The screenshot shows the same web interface as Figure 3, but with an additional message "Login failed!" displayed above the "Username:" and "Password:" input fields. The "Login" button is still present.

Enter a valid username and password and you will be redirected to the Home page.

6.3.2 Home

Upon successful login you will arrive at the home screen. The navigation bar below the Open Pantry title allows for navigation between different tasks. You may also click on any of the icons below to navigate to that specific page

Figure 5 - Home Page



6.3.3 Food

There are four links under the food navigation menu: **Pickups**, **Deliveries**, **Drop Offs**, and **All Records**

Figure 6 - Food Navigation Menu



6.3.3.1 Pickups

The pickups page allows you to view the active clients who are scheduled as pickups.

Figure 7 - Pickup Sign In List



Open Pantry

Home Food Clients Inventory Reporting Settings

Pickup Sign In

Search:

[Click here to sign a family in](#)

	Last	First	Size	Address	Telephone	Start Date	Comments
✓	B	S	6	██████████d	857-██████20	2009-10-28	██████████
✓	B	M	3	██████████Ct	857-██████60	2009-12-09	
✓	B	A	1	██████████210	781-██████11	2009-05-13	
✓	B	M	2	██████████	781-██████31	2009-11-11	
✓	B	C	4	██████████Rd	781-██████37	2009-09-23	
✓	B	R	1	██████████s Dr	781-██████75	2004-10-13	
✓	B	E	2	██████████	781-██████72	2008-12-01	
✓	B	D	5	██████████	781-██████95	2009-03-11	

Search: By typing into the search field the list of pickup clients will be filtered down to only names that match your search text.

Sign-in: Click on the ✓ (Sign-in) next to the client you which to sign-in as coming in for today's pickup. It will bring you to a **Family Bag Pickup** verification page which allows you to verify existing contact.


6.3.3.1 Family Bag Pickup

This page allows you to complete a pickup. Contact information can also be verified at this time.

Figure 8 - Pickup Confirmation and Sign In

Open Pantry

[Home](#) [Food](#) [Clients](#) [Inventory](#) [Reporting](#) [Settings](#)



Family Bag Pickup

[Complete Pickup](#) [Edit Client](#)

Client Information	
Bag Type	Family of Six
First Name	[REDACTED]
Last Name	[REDACTED]
Gender	Female
Date of Birth	1971-02-10
Address	[REDACTED] n Rd
Telephone	[REDACTED]
Start Date:	2009-10-28
Comments:	Life Center

Financial Aid		
Name	Has	Amount
Wages	No	
Unemployment	No	
WIC	No	
Welfare	No	
Head Start	No	
AFDC	No	
Veterans Aid	No	
Social Security	No	
SSI	No	
Other Amount	No	
Fuel Assistance	No	
Food Stamps	No	

Other Family Members		
Name	DOB	Gender
Am [REDACTED]	1993-07-04	Male
Cl [REDACTED]	1994-06-13	Male
Jan [REDACTED]	1992-03-14	Male
S [REDACTED]	1995-12-25	Male
Y [REDACTED]	1997-12-13	Male

Products	
Product	Quantity
Cake mix	1
Canned pasta/stew	6
Cereal	3
Cookies	1
Crackers	3
HHelper/Sides	3
Lg can tomato	1
Lg juice	1
Mac n cheese	6
Ramen	6
Rice (plain, one lb. pkg.)	1
Spag sauce	3
Spaghetti	3
Tuna	6
Variety Pasta	2

Complete Pickup: By clicking the complete pickup a popup will ask to confirm this pickup and you will be redirected to the Pickups page.

Edit Client: Clicking this will bring up the detailed edit page for that particular client.

6.3.3.2 Deliveries

The deliveries page allows you to view the active clients who are scheduled as deliveries.

Figure 9 - Delivery Sign In List

Last	First	Size	Address	Telephone	Start Date	Bag	Comments
✓ [REDACTED]	Stephanie	2	[REDACTED] St	[REDACTED] 79	2008-12-01	Family of Two	
✓ [REDACTED]	Peter	1	[REDACTED] St	[REDACTED] 72	2007-07-11	Family of One	
✓ [REDACTED]	Mike	1	[REDACTED] Dr	[REDACTED] 09	2008-06-01	Family of One	
✓ [REDACTED]	[REDACTED]	2	[REDACTED] Rd	[REDACTED] 63	2005-10-01	Family of Three	
✓ [REDACTED]	Laura	3	[REDACTED]	[REDACTED] 27	2009-09-09	Family of Three	
✓ [REDACTED]	Lisa	3	[REDACTED] Rd	[REDACTED] 24	2005-12-01	Family of Three	
✓ [REDACTED]	Joanne	1	[REDACTED] Dr	[REDACTED] 45	2009-06-09	Family of One	inactive
✓ [REDACTED]	Lillian	1	[REDACTED] Rd	[REDACTED] 67	2008-12-17	Family of One	
✓ [REDACTED]	[REDACTED]	4	[REDACTED] Ave	[REDACTED] 58	2004-10-12	Family of Four	711/ [REDACTED] 6
✓ [REDACTED]	Robert	2	[REDACTED] #20	[REDACTED] 24	2007-11-01	Family of Two	
✓ [REDACTED]	Michelle	2	[REDACTED] Woburn	[REDACTED] 71	2006-02-01	Family of Two	Moved to Woburn

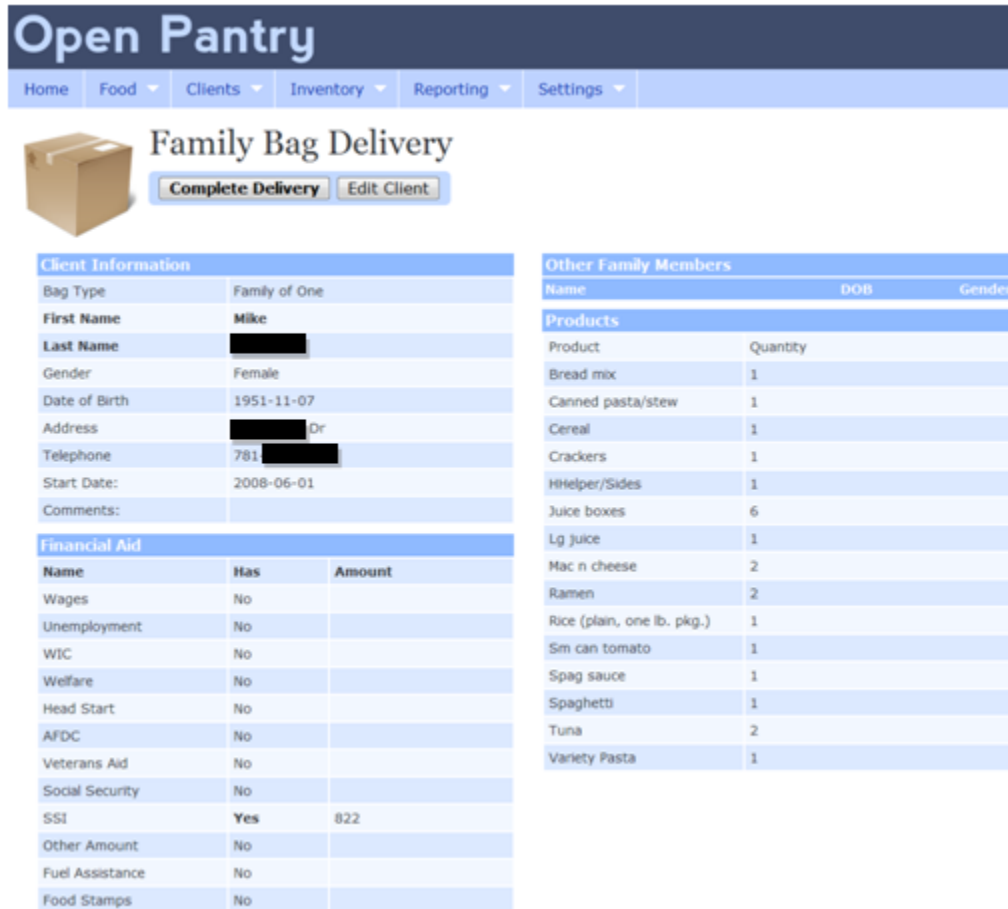
Search: By typing into the search field the list of deliveries clients will be filtered down to only names that match your search text.

Confirm Delivery: Click on the ✓ (Confirm Delivery) next to the client you which to confirm as being delivered to. It will bring you to a **Family Bag Delivery** verification page which allows you to verify existing contact information, update it if needed, and/or confirm the

6.3.3.2 Family Bag Delivery

This page allows you to complete a pickup. Contact information can also be verified at this time.


Figure 10 - Delivery Confirmation



Open Pantry

Home Food Clients Inventory Reporting Settings

Family Bag Delivery

 [Complete Delivery](#) [Edit Client](#)

Client Information	
Bag Type	Family of One
First Name	Mike
Last Name	[REDACTED]
Gender	Female
Date of Birth	1951-11-07
Address	[REDACTED] Dr
Telephone	781 [REDACTED]
Start Date:	2008-06-01
Comments:	

Financial Aid		
Name	Has	Amount
Wages	No	
Unemployment	No	
WIC	No	
Welfare	No	
Head Start	No	
AFDC	No	
Veterans Aid	No	
Social Security	No	
SSI	Yes	822
Other Amount	No	
Fuel Assistance	No	
Food Stamps	No	

Other Family Members		
Name	DOB	Gender
Products		
Product	Quantity	
Bread mix	1	
Canned pasta/stew	1	
Cereal	1	
Crackers	1	
HHelper/Sides	1	
Juice boxes	6	
Lg juice	1	
Mac n cheese	2	
Ramen	2	
Rice (plain, one lb. pkg.)	1	
Sm can tomato	1	
Spag sauce	1	
Spaghetti	1	
Tuna	2	
Variety Pasta	1	

Complete Delivery: By clicking the complete delivery a popup will ask to confirm this delivery and you will be redirected to the Deliveries page.

Edit Client: Clicking this will bring up the detailed edit page for that particular client.

6.3.3.3 Drop Offs

This page allows the user to fill in the weight and cost of any food entered the pantry from any of the food sources defined under **Settings -> Food Sources**

Figure 11 - Complete Food Drop Off



The screenshot shows the 'Open Pantry' web application interface. At the top is a dark blue header with the text 'Open Pantry' in white. Below the header is a navigation bar with tabs: 'Home', 'Food', 'Clients', 'Inventory', 'Reporting', and 'Settings'. The 'Food' tab is selected. Below the navigation bar, there is a red truck icon and the text 'New Drop Off'. To the right of the truck icon is a button labeled 'Complete Drop Off'. Below this is a table with three columns: 'Food Source', 'Weight', and 'Cost'. The table has four rows: 'Greater Boston Food Bank', 'Purchased Goods', 'Project Bread', and 'Donations'. Each row has input fields for 'Weight' and 'Cost'.

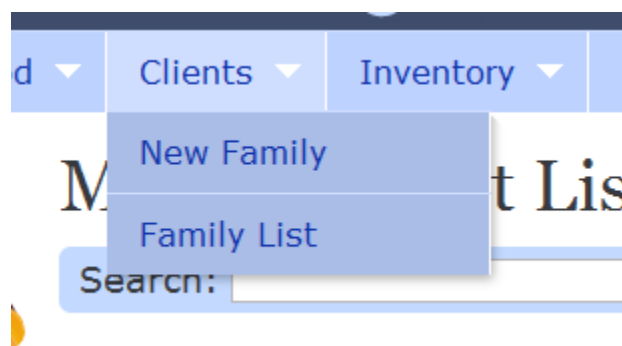
Food Source	Weight	Cost
Greater Boston Food Bank	<input type="text"/>	<input type="text"/>
Purchased Goods	<input type="text"/>	<input type="text"/>
Project Bread	<input type="text"/>	<input type="text"/>
Donations	<input type="text"/>	<input type="text"/>

Complete Drop Off: By clicking this button the information will be saved for logging and reporting.

6.3.4 Clients

There are two sub-pages under the Client navigation menu: **New Family** and **Family List**

Figure 12 - Client Navigation Menu

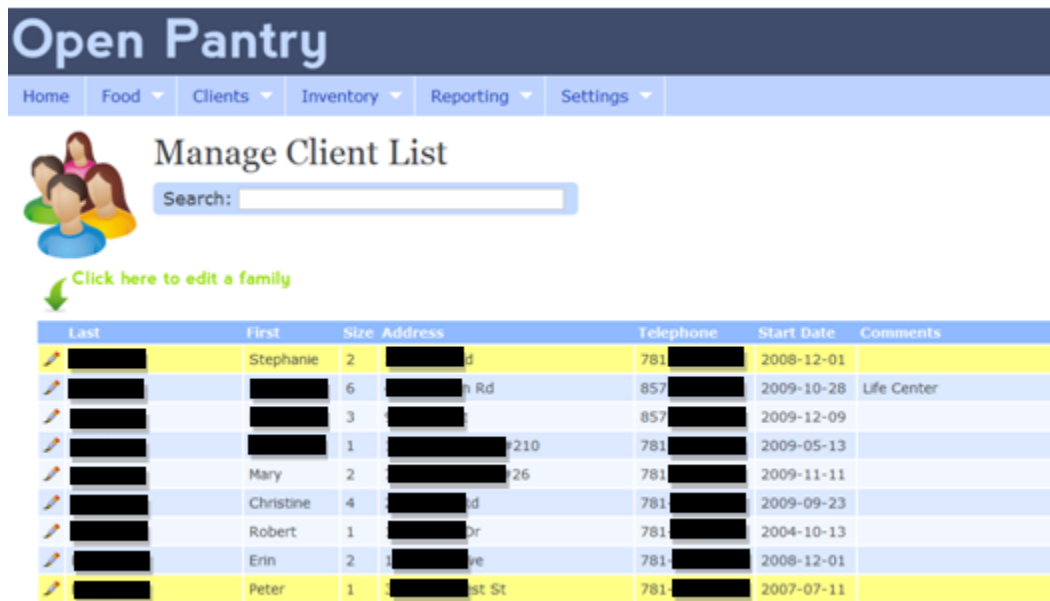


The screenshot shows the 'Client Navigation Menu' in the 'Open Pantry' web application. The 'Clients' tab is selected in the navigation bar. A dropdown menu is open, showing two options: 'New Family' and 'Family List'. Below the dropdown menu is a search bar labeled 'Search:'.

6.3.4.1 Client List

This page is accessible from the menu **Clients-> Family List** and allows the user to manage the list of clients.

Figure 13 - Manage Client List



Open Pantry

Home Food Clients Inventory Reporting Settings


Manage Client List

Search:

[Click here to edit a family](#)

Last	First	Size	Address	Telephone	Start Date	Comments
[Redacted]	Stephanie	2	[Redacted] St	781 [Redacted]	2008-12-01	
[Redacted]	[Redacted]	6	[Redacted] Rd	857 [Redacted]	2009-10-28	Life Center
[Redacted]	[Redacted]	3	[Redacted]	857 [Redacted]	2009-12-09	
[Redacted]	[Redacted]	1	[Redacted] 210	781 [Redacted]	2009-05-13	
[Redacted]	Mary	2	[Redacted] 26	781 [Redacted]	2009-11-11	
[Redacted]	Christine	4	[Redacted] d	781 [Redacted]	2009-09-23	
[Redacted]	Robert	1	[Redacted] Dr	781 [Redacted]	2004-10-13	
[Redacted]	Erin	2	[Redacted] ve	781 [Redacted]	2008-12-01	
[Redacted]	Peter	1	[Redacted] St St	781 [Redacted]	2007-07-11	

Search: By typing into the search field the list of clients will be filtered down to only names that match your search text.

Editing Clients: Click on the  (Edit) next to the client you which view/update detailed information about.

6.3.4.2 Edit Client

This page contains detailed information about a family and allows you to edit this information.

Figure 14 - Edit Detailed Client Information

Open Pantry

Home Food Clients Inventory Reporting Settings

Edit Client

Save Client Complete Sign-In

Client Information

Bag Type	Family of Six
First Name	
Last Name	
Gender	Female
Date of Birth	1971-02-10
Active	<input checked="" type="checkbox"/>
Address	Rd
Telephone	857
Fuel Assistance	<input type="checkbox"/>
USDA Assistance	<input type="checkbox"/>
Delivery	<input type="checkbox"/>
Dietary Restriction	<input type="checkbox"/>
2nd of the month	
4th of the month	<input checked="" type="checkbox"/>
Cooking Facilities:	<input type="checkbox"/>
Start Date:	2009-10-28
Comments:	Life Center

Other Family Members

Name	DOB	Gender
A	1993-07-04	Male
C	1994-06-13	Male
J	1992-03-14	Male
	1995-12-25	Male
	1997-12-13	Male

Name

Date of Birth

Gender

Add Member


Financial Aid

Wages	<input type="checkbox"/>	
Unemployment	<input type="checkbox"/>	
WIC	<input type="checkbox"/>	
Welfare	<input type="checkbox"/>	
Head Start	<input type="checkbox"/>	
AFDC	<input type="checkbox"/>	
Veterans Aid	<input type="checkbox"/>	
Social Security	<input type="checkbox"/>	
SSI	<input type="checkbox"/>	
Other Amount	<input type="checkbox"/>	
Fuel Assistance	<input type="checkbox"/>	
Food Stamps	<input type="checkbox"/>	

Adding New Family Member: To add a new family member type the Name, Date of Birth, and Gender into the Other Family Members table and click Add Member.

Editing Family Member: Click on the (Edit) next to the family member you which edit. It will turn into an editable row where you can change the name, date of birth, and sex of the family.

Saving Family Member Edits: Click on the (Save) next to the family member you have edited. It will then save the change and bring you back to the main **Edit Client** page saving the edit to that member.

Deleting Family Member: Click on the  (Delete) next to the family member you which to delete. A popup prompt will ask you to confirm deletion. Upon confirmation, the family member is deleted from the family.

Financial Aids: Check the checkbox next to any financial aids that the client receives and type the amount of it that they receive.

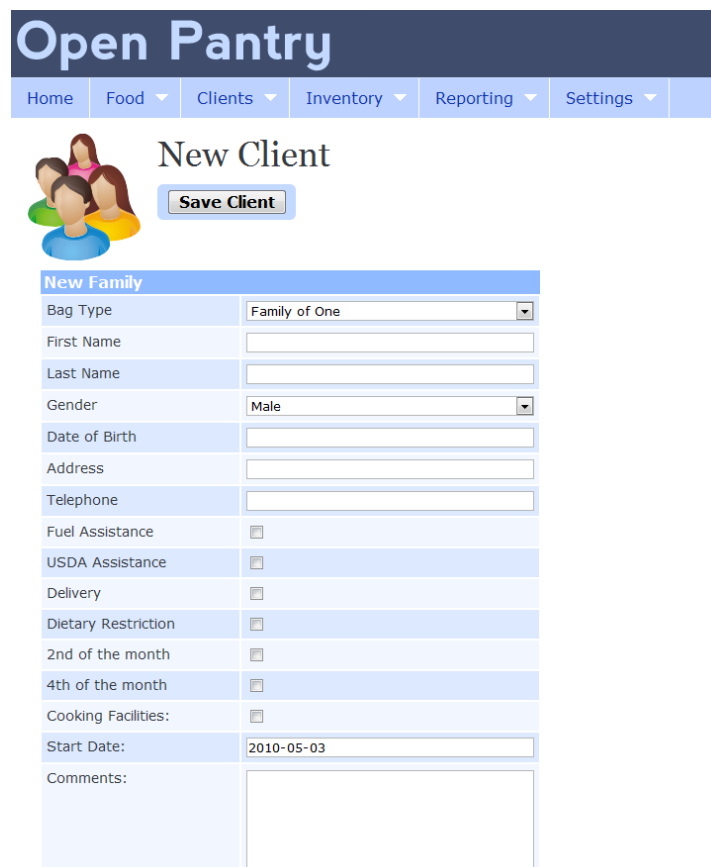
Saving Client Changes: After you are finished updating any fields click the Save Client button to save any changes

Complete Sign-In: Clicking this button will redirect you to the **Complete Delivery** or **Complete Pickup** page

6.3.4.3 New Client

This page is accessible from the menu **Clients-> New Family** and allows you to create a new client or family that is to receive support by the food pantry.

Figure 15 - Create New Client



Open Pantry

Home Food Clients Inventory Reporting Settings

New Client

Save Client

New Family

Bag Type	Family of One
First Name	
Last Name	
Gender	Male
Date of Birth	
Address	
Telephone	
Fuel Assistance	<input type="checkbox"/>
USDA Assistance	<input type="checkbox"/>
Delivery	<input type="checkbox"/>
Dietary Restriction	<input type="checkbox"/>
2nd of the month	<input type="checkbox"/>
4th of the month	<input type="checkbox"/>
Cooking Facilities:	<input type="checkbox"/>
Start Date:	2010-05-03
Comments:	

Fill in the appropriate contact information and select the bag that they should receive from the dropdown of available bags.

Save Client: Clicking this button will create a new family and bring you to the **Edit Client** page.


6.3.5. Inventory

The main navigation menu has four subsections for Inventory: **Bag List**, **New Bag**, **Product List**, and **New Product**

6.3.5.1 Bag List

This page is accessible from the menu **Inventory -> Bag List** and displays the list of available bags the pantry offers.


Figure 16 - Hunger relief Bag List



Name	Clients	Items	Weight	Cost
Family of One	54	15	100 lbs	\$0
Family of Two	42	14	0 lbs	\$0
Family of Three	42	15	0 lbs	\$0
Family of Four	30	15	0 lbs	\$0
Family of Five	9	15	0 lbs	\$0
Family of Six	10	15	10 lbs	\$0
Family of Seven	1	15	0 lbs	\$0
Family of Eight	1	15	0 lbs	\$0
Family of Nine	0	15	0 lbs	\$0
Family of Ten	2	15	0 lbs	\$0
Stephanie Avey (2)	0	44	3 lbs	\$7
Restricted Diet Request family of three	0	15	0 lbs	\$0
Restricted Diet Request Dot Doucette	0	16	0 lbs	\$0
Restricted Diet Request Catherine Mansfield	0	11	0 lbs	\$0

Search: By typing into the search field the list of bags will be filtered down to only names that match your search text.

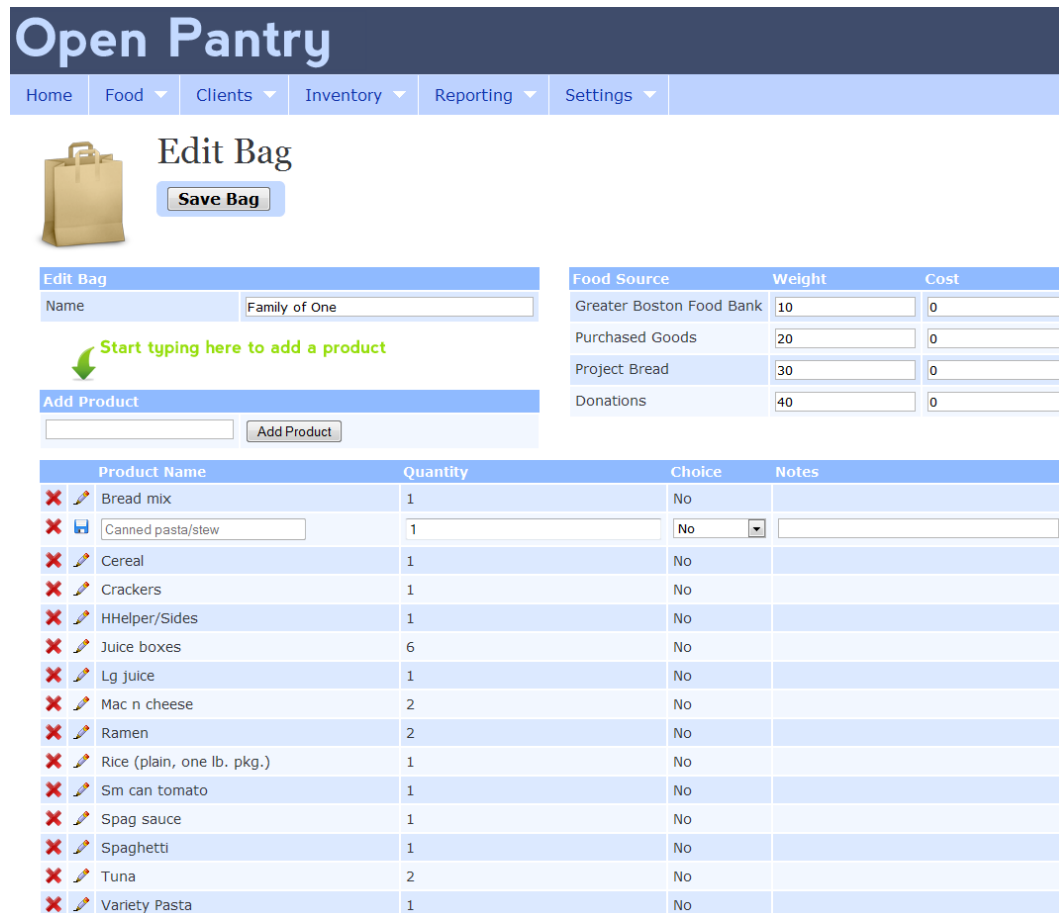
Editing Bags: Click on the (Edit) next to the bag you which view/edit detailed information about. See **Edit Bag**

Deleting Bags: Click on the  (Delete) next to the bag you which to delete. A popup prompt will ask you to confirm deletion. Upon confirmation, the bag is deleted from the system.




























6.3.5.2 Edit Bag

The page is accessible after clicking the edit icon next to a bag on the Bag List page and allows for the management of products, quantities, and food sources that make up a make.


Figure 17 - Edit Bag Contents and Food Sources




Food Source	Weight	Cost
Greater Boston Food Bank	10	0
Purchased Goods	20	0
Project Bread	30	0
Donations	40	0

Product Name	Quantity	Choice	Notes
  Bread mix	1	No	
  Canned pasta/stew	1	No	
  Cereal	1	No	
  Crackers	1	No	
  HHelper/Sides	1	No	
  Juice boxes	6	No	
  Lg juice	1	No	
  Mac n cheese	2	No	
  Ramen	2	No	
  Rice (plain, one lb. pkg.)	1	No	
  Sm can tomato	1	No	
  Spag sauce	1	No	
  Spaghetti	1	No	
  Tuna	2	No	
  Variety Pasta	1	No	

Saving Bag Edits: After changes the name of the bag or the weight and cost distribution of the bag contents from various sources the **Save Bag** button can be clicked to save changes.

Editing Products: Click on the  (Edit) next to the product you which edit. It will turn into an editable row where you can change the quantity and notes associated with the product.

Saving Product Edits: Click on the  (Save) next to the product you have edited. It will then save the change and bring you back to the main **Edit Bag** page.


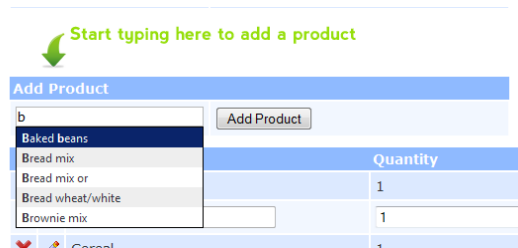
Deleting Products: Click on the  (Delete) next to the product you wish to delete. A popup prompt will ask you to confirm deletion. Upon confirmation, the product is deleted from the bag.

Figure 18 - Add Product to Bag



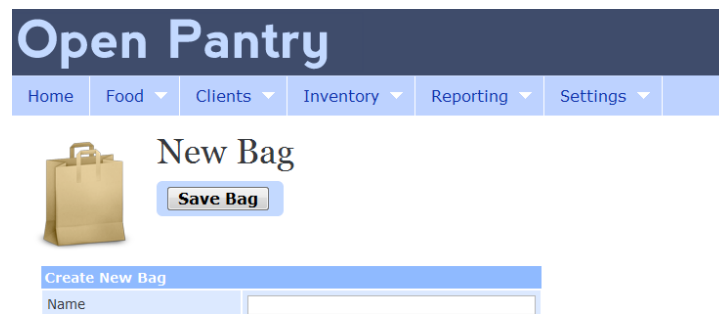
Quantity
1

Adding New Products: To add a new product to the bag start typing the name of the product to add in the textbox next to the “Add Product” button. Product names that are in the inventory will be auto-suggested as you add the product.

6.3.5.3 New Bag

This page is used for creating a new bag that clients can receive such as a bag based on family size or for a person with a restricted diet due to allergies or diabetes.

Figure 19 - Create New Hunger relief Bag

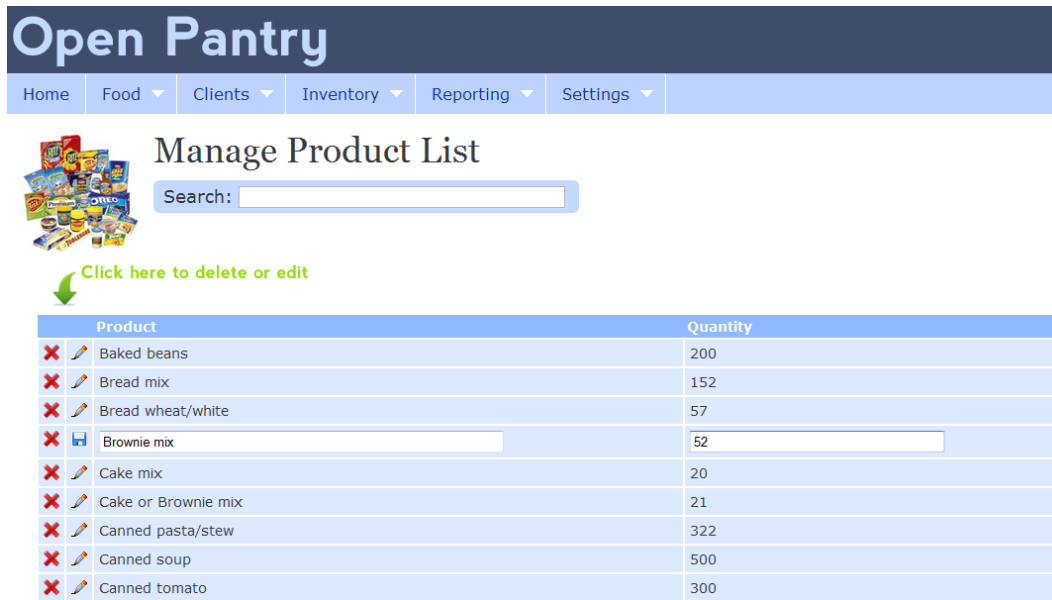


Type in the name of the bag you wish you create, click the “Save Bag” button, and you will be redirected to the **Edit Bag** page.

6.3.5.4 Product List

This page is accessible from the menu **Inventory -> Product List** and displays the list of available products the pantry offers.

Figure 20 - Manage Product Inventory






















Open Pantry

Home Food Clients Inventory Reporting Settings


Manage Product List


Search:


[Click here to delete or edit](#)

	Product	Quantity
 	Baked beans	200
 	Bread mix	152
 	Bread wheat/white	57
  	Brownie mix <input type="text" value=""/>	<input type="text" value="52"/>
 	Cake mix	20
 	Cake or Brownie mix	21
 	Canned pasta/stew	322
 	Canned soup	500
 	Canned tomato	300

Search: By typing into the search field the list of products will be filtered down to only names that match your search text.

Editing Products: Click on the  (Edit) next to the product you which edit. It will turn into an editable row where you can change the quantity and notes associated with the product.

Saving Product Edits: Click on the  (Save) next to the product you have edited. It will then save the change and bring you back to the main **Product List** page.

Deleting Products: Click on the  (Delete) next to the product you which to delete. A popup prompt will ask you to confirm deletion. Upon confirmation, the product is deleted from the bag.

Adding New Products: To add a new product to the bag start typing the name of the product to add in the textbox next to the “Add Product” button. Product names that are in the inventory will be auto-suggested as you add the product.

6.3.5.4 New Product

This page allows you to create a new product in the inventory.

Figure 21 - Create New Inventory Item



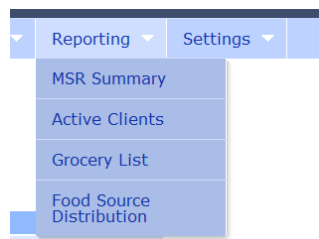
The screenshot shows the 'Open Pantry' application interface. At the top is a dark blue header with the text 'Open Pantry' in white. Below the header is a navigation bar with several tabs: 'Home', 'Food', 'Clients', 'Inventory', 'Reporting', and 'Settings'. The 'Inventory' tab is currently selected. Below the navigation bar, there is a section titled 'New Product' with a small image of various food items. To the right of the image is a button labeled 'Save Product'. Below this is a form titled 'Create New Product' with two input fields: 'Name' and 'Quantity'.

Type in the name of the product and quantity in the inventory you wish you create, click the “Save Bag” button, and you will be redirected to the **Product List** page.

6.3.6. Reporting

The main navigation menu has four subsections for Reporting: **MSR Summary**, **Active Clients**, **Grocery List**, and **Food Source Distribution**

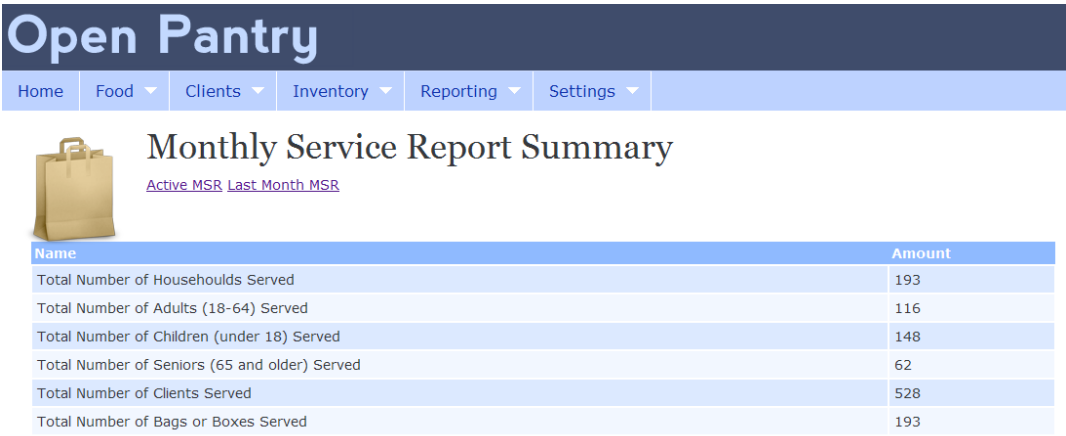
Figure 22 - Reporting Navigation Menu



6.3.6.1 MSR Summary

This page is accessible from the menu **Reporting -> MSR Summary** and displays the information typically needed for a Monthly Service Report.

Figure 23 - Monthly Service Reporting



The page has the options to either view the MSR Report for the current month based off of **Active Clients** or to view the MSR Report for the **Last Month**.

6.3.6.2 Active Clients

This page is accessible from the menu **Reporting -> Active Clients** and displays the information about how many clients are scheduled for pickups/deliveries on the different distribution days as well as last month's transactions.

Figure 24 - Expected Pickups and Deliveries on Each Distribution Day

Open Pantry				
Home	Food	Clients	Inventory	Reporting
Active Clients				
	Active		Last Month	
	2nd Wednesday	4th Wednesday	2nd Wednesday	4th Wednesday
Pickups	100	85	2	0
Deliveries	8	5	0	0
Total	108	90	2	0

6.3.6.3 Grocery List

This page is accessible from the menu **Reporting -> Grocery List** and displays the information about how many products are schedule to be distributed this as well as last month's transactions.

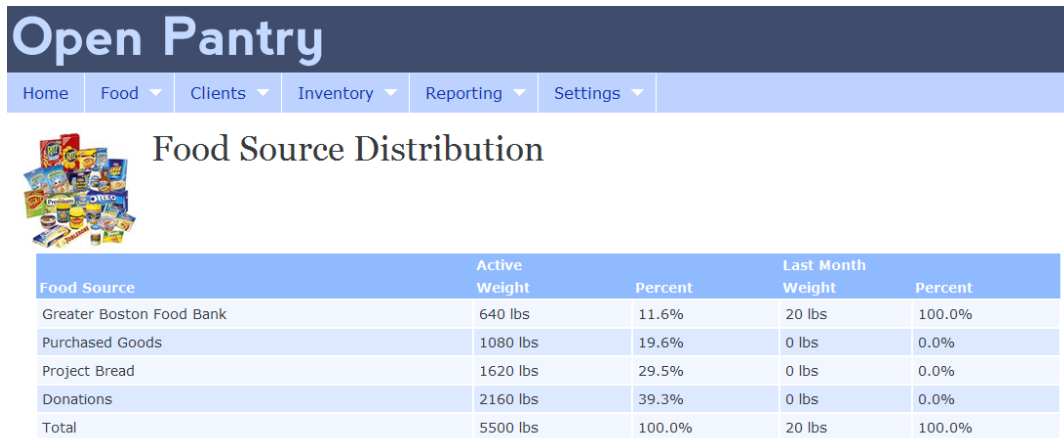
Figure 25 - Expected Monthly Grocery List

Open Pantry		
Home	Food	Clients
Inventory	Reporting	Settings
Grocery List		
Product	Quantity	Last Month
Bread mix	96	0
Canned pasta/stew	520	12
Cereal	303	6
Crackers	385	6
HHelper/Sides	312	6
Juice boxes	324	0
Lg juice	195	2
Mac n cheese	578	12
Ramen	578	12
Rice (plain, one lb. pkg.)	191	2
Sm can tomato	96	0

6.3.6.3 Food Source Distribution

This page is accessible from the menu **Reporting -> Food Source Distribution** and displays the information about how much food distributed came from various food sources as weight, cost, and percentage.

Figure 26 - Food Source Distribution Report



6.3.7. Settings

The main navigation menu has two subsections for **Settings**: **Financial Aids** and **Food Sources**

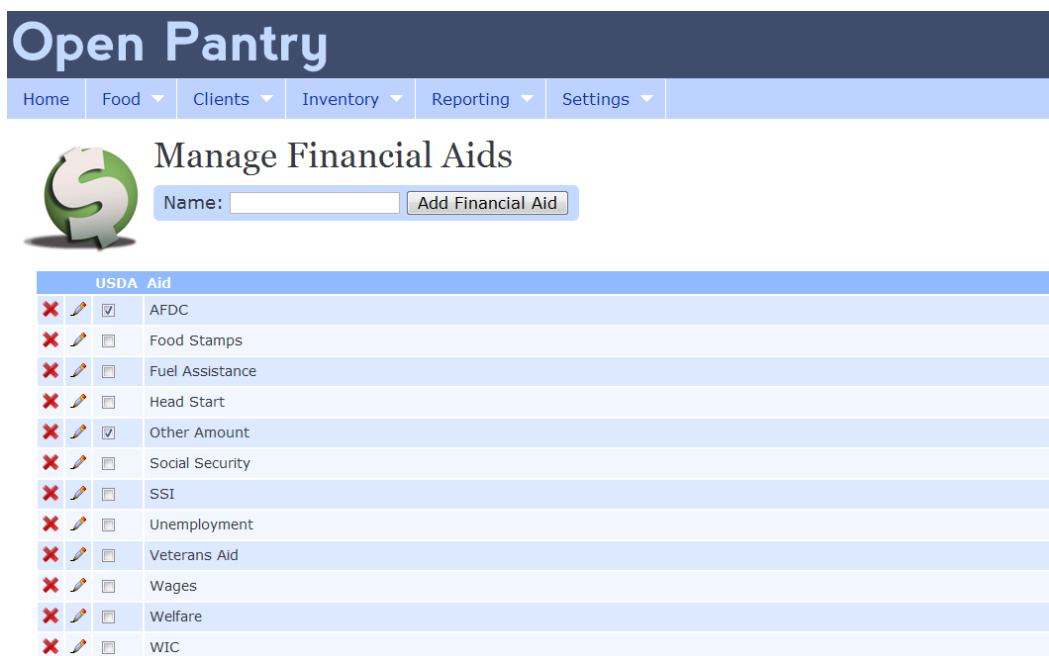
Figure 27 - Settings Navigation Menu




6.3.7.1 Financial Aid List


This page is accessible from the menu **Settings -> Financial Aids** and displays the information what financial aids are available to be tracked.


Figure 28 - Manage Financial Aids



USDA	Aid
<input checked="" type="checkbox"/>	AFDC
<input type="checkbox"/>	Food Stamps
<input type="checkbox"/>	Fuel Assistance
<input type="checkbox"/>	Head Start
<input checked="" type="checkbox"/>	Other Amount
<input type="checkbox"/>	Social Security
<input type="checkbox"/>	SSI
<input type="checkbox"/>	Unemployment
<input type="checkbox"/>	Veterans Aid
<input type="checkbox"/>	Wages
<input type="checkbox"/>	Welfare
<input type="checkbox"/>	WIC

Editing Financial Aid: Click on the  (Edit) next to the aid you which edit. It will turn into an editable row where you can change the USDA qualifier field and name the aid.

Saving Financial Aid Edit: Click on the  (Save) next to the aid you have edited. It will then save the change and bring you back to the main **Financial Aid List** page.

Deleting Financial Aid: Click on the  (Delete) next to the aid you which to delete. A popup prompt will ask you to confirm deletion. Upon confirmation, the aid is deleted from the system.

Adding New Financial Aid: To add a new financial aid, type the name of the aid you wish to create in the textbox next to the “Add Product” button. Click the “Add Financial Aid” button to create a new record in the system for this aid and redirect you back to the Financial Aids List.


6.3.7.2 Food Source List


This page is accessible from the menu **Settings -> Food Sources** and displays the information what food sources are available to be tracked.


Figure 29 - Manage Food Sources



Food Source	
	Donations
	Greater Boston Food Bank
	Project Bread
	Purchased Goods

Editing Food Source: Click on the  (Edit) next to the food source you which edit. It will turn into an editable row where you can change the name.

Saving Food Source Edit: Click on the  (Save) next to the food source you have edited. It will then save the change and bring you back to the main **Financial Aid List** page.

Deleting Food Source: Click on the  (Delete) next to the food source you which to delete. A popup prompt will ask you to confirm deletion. Upon confirmation, the food source is deleted from the system.

Adding New Food Source: To add a new food source, type the name of the food source you wish to create in the textbox next to the “Add Food Source” button. Click the “Add Food Source” button to create the new food source and redirect you back to the Financial Aids List.

7. Conclusions and Recommendations

The initial research focused on the general hunger problem. It is clear that across both the globe and the United States, the hunger problem is getting worse. Many organizations have been established over the years to combat hunger internationally, nationally, and at the state and local levels. The sponsor of this project is one of those organizations, the Burlington Community Food Pantry. The pantry requires a solution that will increase the efficiency of its volunteers and reliability of data. That solution has been the focus of this project.

Further research was conducted to understand the Burlington Community Food Pantry within the context of other organizations. The additional research covers The Emergency Food Assistance Program, the Massachusetts Emergency Food Assistance Program and Feeding America; the Burlington Community Food Pantry was also heavily researched. In addition to the operations of these organizations, the software they used was also researched. This gave great insight to the trends of the hunger relief community in terms of technology.

Once the problem and status quo were understood, it became possible to study the needs of the pantry. The plan was to conduct interviews with the pantry staff, research existing software solutions and observe the pantry operations. The interviewing was successful, providing the project with documentation about the operations and procedures of the pantry. The software research revealed an existing solution that was—unfortunately—out of the question. This other solution served as both a guide and a warning. Finally, the observation of pantry operations helped bring all of the processes to light.

When the context of the problem and the pantry itself were understood, analysis allowed for rigorous explanation of the users and the tasks they are to perform. Then knowledge of the problem, the users and the tasks were combined to create a formal software requirements specification document. The format is based on a standard template. These requirements were then approved by the project sponsor, finalizing the analysis.

From the software requirements specification, a software design specification was created. Again, this format is based on a standard template. The formal presentation of the design coincides with industry standards so that other software engineers may understand the environment, decisions and rationale associated with the final software package. The design was then implemented and finally

documented for the pantry staff in the form of a user manual. This process went smoothly; the project has successfully attained its goals.

It is the recommendation of the project authors that the Burlington Community Food Pantry adopt the Open Pantry information management solution. The resultant software package of this project directly addresses the requirements of the Burlington Community Food Pantry. By using this solution, the pantry can improve the efficiency of its operations. This will attract new volunteers, encourage current volunteers to stay, allow for accurate reporting and enable the pantry to support a larger capacity of clients.

It is also the recommendation of the project authors that other food pantries adopt the Open Pantry information management solution. The software design is targeted at the general requirements of food pantries, so the solution should be easily adaptable to most. The more food pantries that use this solution, the more successful the outcomes of this project become. The approach for informing other food pantries will be to send letters to local pantry coordinators that will explain the context and availability of the Open Pantry software.

Lastly, it is the recommendation of the project authors that other open source developers use, learn from and adapt the Open Pantry software package to best accommodate the needs of other organizations. The ultimate result of this project is open source and free alternative software for low-level hunger relief organizations. This product should be recognized as an available starting point for any developers seeking to apply software as a means to manage food pantries.

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9. Appendices

A: Food Pantry Automation Project

BURLINGTON FOOD PANTRY AUTOMATION PROJECT

The Burlington Food Pantry is a volunteer organization that provides food for Burlington families during times of hardship. In the past year the number of clients we serve has increased nearly fifty percent which has put pressure on our resources and volunteer staff. Currently, we operate from a card catalog, inventory control is non-existent, and the grocery list is dependent on our retiring coordinators experience. In order to continue to provide services with a volunteer workforce, we must efficiently manage a client database, generate a grocery inventory, develop an acquisition strategy, and direct volunteer activities. In order to meet this increasing demand, we would like to automate our operation.

PRIMARY OBJECTIVES

CLIENT DATABASE

- Client information—names, gender, date of birth, sources of income
- Track number of bags given out based on family size
- Track birthdays for birthday package distribution
- Monthly list of families with dietary needs
- Monthly list of families requiring deliveries
- Monthly list of seniors (Greater Boston Food Bank (GBFB) report)
- List children for various fund raisers

GROCERY INVENTORY AND ACQUISITION CONTROL

- Inventory database linked to distribution
- Track cost per family
- Show total of each item needed monthly based on distribution numbers
- Inventory system flexible enough for tracking donations, purchases, and GBFB goods
- Set up automated reports for the GBFB
- Possibly link normal inventory items with weekly grocery store flyers to flag bargains and maximize cost savings

VOLUNTEER DATABASE

- Name, address, e-mail, phone number
- Usual or preferred jobs
- Number of hours willing to volunteer
- Possibly an Online Bulletin Board to sign up for jobs (explore volunteer knowledge and availability to use computers)

B: Pantry Operation Overview

Operation Overview Pantry

Staffing

- *January 1, 2010—38 volunteer staff*
- *March 1, 2010—65 volunteer staff and 14 alternates*

Weekly man hours

- *40 hours—director*
 - *Oversee all BCFP operations*
 - *Maintain database*
 - *Prepare monthly GBFB MSR report*
 - *Prepare projection report for monthly preparation*
 - *Manage budget*
 - *Audit inventory bi-monthly*
 - *Order retail groceries and supplies*
 - *GBFB grocery order (2 hours on the computer)*
 - *Train volunteer staff*
 - *Schedule volunteer staff*
 - *Schedule and receive donations*
- *80 hours—volunteer staff*
 - *Tuesday and Wednesday baggers*
 - *Wednesday transporters*
 - *Wednesday shelving and preparation*
 - *Wednesday delivery*
 - *Wednesday distribution*
 - *Panera pick up*
 - *Donation bin pick up*
 - *GBFB pick up and shelving*
 - *Saturday sorters for all incoming donations*

February distribution amount

- *~8000 pounds (25 lbs./person)*
- *~\$10,000 (\$32/person)*
 - *24% GBFB*
 - *20% pantry account*
 - *56% food donations*

Client participation in February

- *112 households*
- *308 people*
- *Plus 6 non- residents*

C: FIFO Procedures

FIFO PROCEDURES **(First In First Out)**

- I. All food donations must be **date checked**.
 - a. **Infant formula/baby food must be used before the Use By date.**
(These foods should be checked every two weeks to be sure that they are still current—remember the client may have them on their shelf for a month so move them to out dated shelf one month before expiration.)
 - b. Items with the current month's date and items less than one year old should be placed on the shelf for edible outdated food.
 - c. Most items more than 1 year old should be thrown out.
 - i. There are a few exceptions:
 1. Canned meats are good for 2-5 years
 2. Sugar has no expiration
 3. For a detailed list refer to the brochure on the bulletin board
 - ii. **When in doubt, throw it out.**

**ANY CAN WITH RUST, BULGING OR DENTS ON THE SEAM MUST
BE DISCARDED**
**OPEN BOXES WITH NO INNER PACKAGING OR BOXES THAT WERE
WET ARE TO BE DISCARDED**

- II. Once the date check is complete, products may be placed in bins (or in cases) on storage shelves or on the distribution shelves.
 - a. When products arrive in cases, clearly mark the product date on the case and put on the shelf in the case. (**Cases are only to be opened when the older products have been distributed.**)
 - b. Items which are current should be shelved with the **expiration date facing out and right side up.** (This does not apply to canned items.)
Newer items should be placed to the back of the shelves and older items toward the front. **WHEN BAGGING USE THE OLDEST ITEMS FIRST—YOU WILL FIND THEM IN THE FRONT SECTION OF EACH SHELF.**

FOLLOWING FIFO PROCEDURES MINIMIZES WASTE
THANK YOU

D: MySQL Table Queries

```
CREATE TABLE `aid` (  
  `aidid` int(10) unsigned NOT NULL AUTO_INCREMENT,  
  `name` varchar(64) NOT NULL,  
  `usda_qualifier` tinyint(1) NOT NULL,  
  PRIMARY KEY (`aidid`),  
  UNIQUE KEY `name` (`name`)  
) ENGINE=MyISAM DEFAULT CHARSET=latin1;
```

```
CREATE TABLE `bag` (  
  `bagid` int(10) unsigned NOT NULL AUTO_INCREMENT,  
  `name` varchar(64) NOT NULL,  
  PRIMARY KEY (`bagid`),  
  UNIQUE KEY `name` (`name`)  
) ENGINE=MyISAM DEFAULT CHARSET=latin1;
```

```
CREATE TABLE `bag_to_food_source` (  
  `sourceid` int(10) unsigned NOT NULL,  
  `bagid` int(10) unsigned NOT NULL,  
  `weight` float NOT NULL,  
  `price` float NOT NULL,  
  PRIMARY KEY (`sourceid`, `bagid`)  
) ENGINE=MyISAM DEFAULT CHARSET=latin1;
```

```
CREATE TABLE `bag_to_product` (  
  `bagid` int(10) unsigned NOT NULL,  
  `productid` int(10) unsigned NOT NULL,  
  `quantity` int(10) unsigned NOT NULL,  
  `choice` tinyint(1) NOT NULL,  
  `notes` text NOT NULL,  
  PRIMARY KEY (`bagid`, `productid`)  
) ENGINE=MyISAM DEFAULT CHARSET=latin1;
```

```
CREATE TABLE `client` (  
  `clientid` int(10) unsigned NOT NULL AUTO_INCREMENT,  
  `familyid` int(10) unsigned DEFAULT NULL,  
  `first_name` varchar(32) NOT NULL,  
  `last_name` varchar(32) NOT NULL,  
  `gender` tinyint(1) NOT NULL,  
  `dob` date NOT NULL,  
  PRIMARY KEY (`clientid`),  
  KEY `familyid` (`familyid`)  
) ENGINE=MyISAM DEFAULT CHARSET=latin1;
```

```
CREATE TABLE `family` (  
  `clientid` int(10) unsigned NOT NULL,  
  `bagid` int(10) unsigned NOT NULL,  
  `active` tinyint(1) NOT NULL,  
  `address` text NOT NULL,
```

```

`telephone` varchar(16) NOT NULL,
`fuel_assistance` tinyint(1) NOT NULL,
`usda_assistance` tinyint(1) NOT NULL,
`delivery` tinyint(1) NOT NULL,
`dietary` tinyint(1) NOT NULL,
`pickup_second` tinyint(1) NOT NULL,
`pickup_fourth` tinyint(1) NOT NULL,
`cooking_facilities` tinyint(1) NOT NULL,
`start_date` date NOT NULL,
`comments` text NOT NULL,
PRIMARY KEY (`clientid`),
KEY `bagid` (`bagid`)
) ENGINE=MyISAM DEFAULT CHARSET=latin1;

CREATE TABLE `family_to_aid` (
  `clientid` int(10) unsigned NOT NULL,
  `aidid` int(10) unsigned NOT NULL,
  `amount` float NOT NULL,
  PRIMARY KEY (`clientid`,`aidid`)
) ENGINE=MyISAM DEFAULT CHARSET=latin1;

CREATE TABLE `food_source` (
  `sourceid` int(10) unsigned NOT NULL AUTO_INCREMENT,
  `name` varchar(64) NOT NULL,
  PRIMARY KEY (`sourceid`)
) ENGINE=MyISAM DEFAULT CHARSET=latin1;

CREATE TABLE `product` (
  `productid` int(10) unsigned NOT NULL AUTO_INCREMENT,
  `name` varchar(64) NOT NULL,
  `quantity` int(10) unsigned NOT NULL,
  PRIMARY KEY (`productid`),
  UNIQUE KEY `name` (`name`)
) ENGINE=MyISAM DEFAULT CHARSET=latin1;

CREATE TABLE `transaction` (
  `transactionid` int(10) unsigned NOT NULL AUTO_INCREMENT,
  `clientid` int(10) unsigned DEFAULT NULL,
  `delivery` bit(1) NOT NULL,
  `date` date NOT NULL,
  PRIMARY KEY (`transactionid`),
  KEY `clientid` (`clientid`)
) ENGINE=MyISAM DEFAULT CHARSET=latin1;

CREATE TABLE `transaction_to_food_source` (
  `transactionid` int(10) unsigned NOT NULL,
  `sourceid` int(10) unsigned NOT NULL,
  `weight` float NOT NULL,
  `price` float NOT NULL,
  PRIMARY KEY (`transactionid`,`sourceid`)
) ENGINE=MyISAM DEFAULT CHARSET=latin1;

```

```
CREATE TABLE `user` (  
  `userid` int(10) unsigned NOT NULL AUTO_INCREMENT,  
  `username` varchar(64) NOT NULL,  
  `password` varchar(64) NOT NULL,  
  `salt` char(32) NOT NULL,  
  `first_name` varchar(64) NOT NULL,  
  `last_name` varchar(64) NOT NULL,  
  `email` varchar(64) NOT NULL,  
  `access` int(2) unsigned NOT NULL,  
  PRIMARY KEY (`userid`),  
  UNIQUE KEY `username` (`username`)  
) ENGINE=MyISAM DEFAULT CHARSET=latin1;
```